


HARVARD

# medicine



SPRING 2020





## *a sense of place*

Vanderbilt Hall's main entrance fronts onto Avenue Louis Pasteur, but there is another way in to the 93-year-old student dormitory: the arched entrance on Longwood Avenue. The quiet anticipation expressed by this brief entryway reminds us that although students have dispersed, studying and sheltering at home or elsewhere during this pandemic, "Vandy" stands solid and true, ready to welcome them and again serve as their home away from home.



**MEDICINE IS, AT ITS BEST, AN UNSELFISH AND ALTRUISTIC CALLING.** This pandemic has brought this fact into sharp focus by casting a bright light on the selfless and tireless work of the physicians, nurses, technicians, and staff throughout our nation who are working on the frontlines. For any physician, and for all medical students in training, the current public health threat of COVID-19 will be the defining medical experience of their lifetime.

I am so proud of the major role that HMS is playing in confronting this crisis. A large number of our clinical faculty and trainees at our affiliated hospitals and countless alumni throughout the country and around the world are toiling, often at considerable personal risk, to provide compassionate care under the most difficult of circumstances.

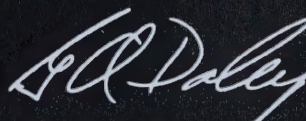
Our researchers have diverted their exceptional creativity and expertise to the new scientific challenge posed by SARS-CoV-2. Many are part of the Massachusetts Consortium on Pathogen Readiness (MassCPR), a multi-institutional collaboration addressing the challenges to diagnostics, clinical management, epidemiology, therapeutics, vaccine development, and pathogenesis presented by this coronavirus and preparing for future outbreaks. MassCPR unites hundreds of researchers, physician-scientists, clinicians, and epidemiologists and their collaborators at the Guangzhou Institute of Respiratory Health and Tsinghua University in China and a growing number of collaborators around the world.

With remarkable speed and adaptability—and no small measure of spirited cooperation—our clinical and teaching faculty have moved our preclinical medical and graduate curriculum online so that HMS may continue to deliver on its educational mission. When clinical-stage medical students were withdrawn temporarily from their rotations, our educators rapidly developed online clerkships in radiology and pathology and are now planning ways to reengage students in clinical work once routine clinical care resumes. And although our medical students have dispersed, they are showing remarkable unity, coming together to form the COVID-19 Student Response Team, which has developed four broad initiatives, including a brilliant online COVID-19 curriculum that has been translated into multiple languages and adopted in over one hundred countries as of late May.

After the first several months of this pandemic, we have learned many lessons about the fragility of our health care systems and the harsh realities of health and income disparities that cause the greatest harm to accrue to those who already suffer the most. We must learn the painful lessons that this stress test is teaching so that we may address our current deficiencies and rebuild our system to deliver health care in a far more universal and equitable manner.

For more than two hundred years, the people of Harvard Medical School—its students, faculty, postdocs, staff, and alumni—have made this great institution a leader in medical education, biomedical research, and service to the world. Our school has faced difficult and uncertain times before and emerged from them stronger. It will do the same with this crisis.

We know the task before us. Let us move forward and be the healers we are.



**George Q. Daley**  
Dean of Harvard Medical School





p. 12

**DAWN OF A NEW DAY:** On a mid-April morning during the campus shutdown, early sunlight brightens Gordon Hall as a waning Moon retreats from its night watch.



# contents

Spring 2020 | Volume 93 | Number 2

## SPECIAL REPORT PANDEMIC

### 11 The Presence of Contagion

by Ann Marie Menting  
photography by Gretchen Ertl

A photo essay of the campus during the COVID-19 pandemic.

### 20 In the Grip of a Disease

by Elizabeth Gehrman

During the 1918 influenza pandemic, HMS students, faculty, and alumni stepped in to care for the afflicted and research the cause.

### 26 Student Perspectives

by Elizabeth Gehrman  
and Ann Marie Menting

Five HMS students consider how the 2020 pandemic has changed their lives but not their commitment to medicine and biomedical research.

## FEATURE

### 34 Bookshelf

An excerpt from *Superbugs: The Race to Stop an Epidemic* by Matthew McCarthy.

## DEPARTMENTS

### 5 Commentaries

Letters from our readers

### 6 Discovery

Research at Harvard Medical School

### 10 Noteworthy

News from Harvard Medical School

### 31 Five Questions

by Ekaterina Pesheva

Lisa Goodrich on neural circuits, the slow beauty of scientific discovery, and the importance of mentoring

### 32 BackStory

by Dominic Hall

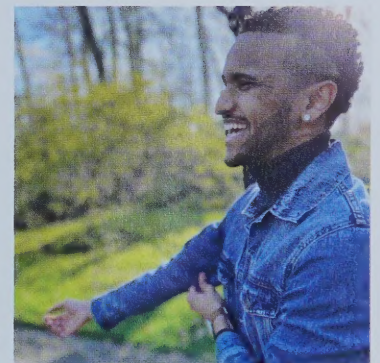
An influenza outbreak at Camp Devens led to a research push to identify the causative agent

### 38 Rounds

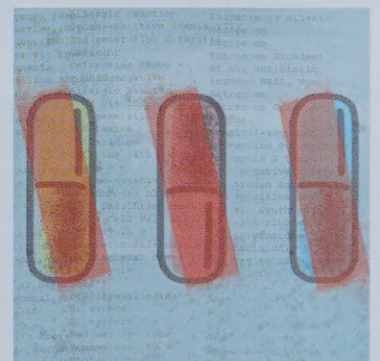
Alumni recount their love of music and the role it plays in their lives



p. 20



p. 26



p. 34





#### MATCH DAY 2020

### Actual virtual joy

FOR THE FIRST TIME, the annual HMS Match Day celebration went virtual, a response to the COVID-19 pandemic that moved classes online and students off campus. Eve Roth, who matched in general surgery at Beth Israel Deaconess Medical Center, is one of the School's 177 graduating MD students, 170 of whom matched to clinical training, internship, or residency programs.

# HARVARD medicine

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## Shout-out

I was delighted to receive my copy of the Winter 2020 issue of *Harvard Medicine* magazine highlighting LGBTQ health. As a proud HMS alum, a member of the LGBTQ community, and a clinician-educator working in this field, I was thrilled to see the array of outstanding work being done by HMS faculty to better understand and address issues in LGBTQ health care and to educate trainees to meet the health needs of LGBTQ populations. I was particularly excited about the Sexual and Gender Minorities Health Equity Initiative and the potential positive effect of a curricular undertaking of this magnitude. And I'm so glad to see the participation of faculty and student leaders featured in the magazine.

However, I was struck by the absence of featured staff leaders, particularly Jessica Halem, the LGBTQ outreach and engagement director for HMS, who plays a key role in this undertaking. As the medical director of a transgender health program as well as a leader in medical education at my institution, I am especially aware that great health equity programs and medical curricula cannot thrive without tremendous staff leadership. Indeed, it is rare for a medical school to have an administrative role to emphasize LGBTQ engagement and curricular presence at all. I would like to see HMS proudly highlight its commitment to administrative support of the LGBTQ community as well as the outstanding work of staff in this area.

JENNIFER SIEGEL, MD '07  
BOSTON, MASSACHUSETTS

*Ed: You are so right, Dr. Siegel. It is important to acknowledge the paradigm-shifting work that Jessica and her team do. They are exemplary professionals who are dedicated to helping the School fulfill its commitment to improve health equity for members of the LGBTQ community.*



## Progeny

Your journal is terrific, with excellent articles on important subjects, relished even by this long-retired octogenarian. I have but one request: that any persons mentioned be identified by their relationship to former Harvard persona, if applicable. For example, is David Diamond the son of Louis Diamond, renowned hematologist and professor at Boston Children's Hospital? (I believe Lou Diamond did have a son named David.) Is Mark Schuster the son of Sam Schuster, excellent surgeon at the same institution, shining

even under the shadow of his mentor, Robert Gross? It would be comforting to people like me to know that the offspring of our revered professors' offspring have "made it," as did their parents.

CHARLES BURDEN, MD '59  
OLD ORCHARD BEACH, MAINE

*Ed: Your challenge is a great one, Dr. Burden, given the hundreds of years HMS has been producing outstanding physicians and faculty.*

*We posed your questions to Drs. Schuster and Diamond and heard from Dr. Schuster before we went to press. He wrote, "I'm afraid I'm not related to Sam Schuster, but if I had been, we could have had interesting conversations during family gatherings. I've heard such wonderful things about him."*

*Dr. Burden, if you're again curious about the HMS familial links of those who appear in future issues, please write us. We stand ready to ferry your questions to those who may know.*

## Hitting home

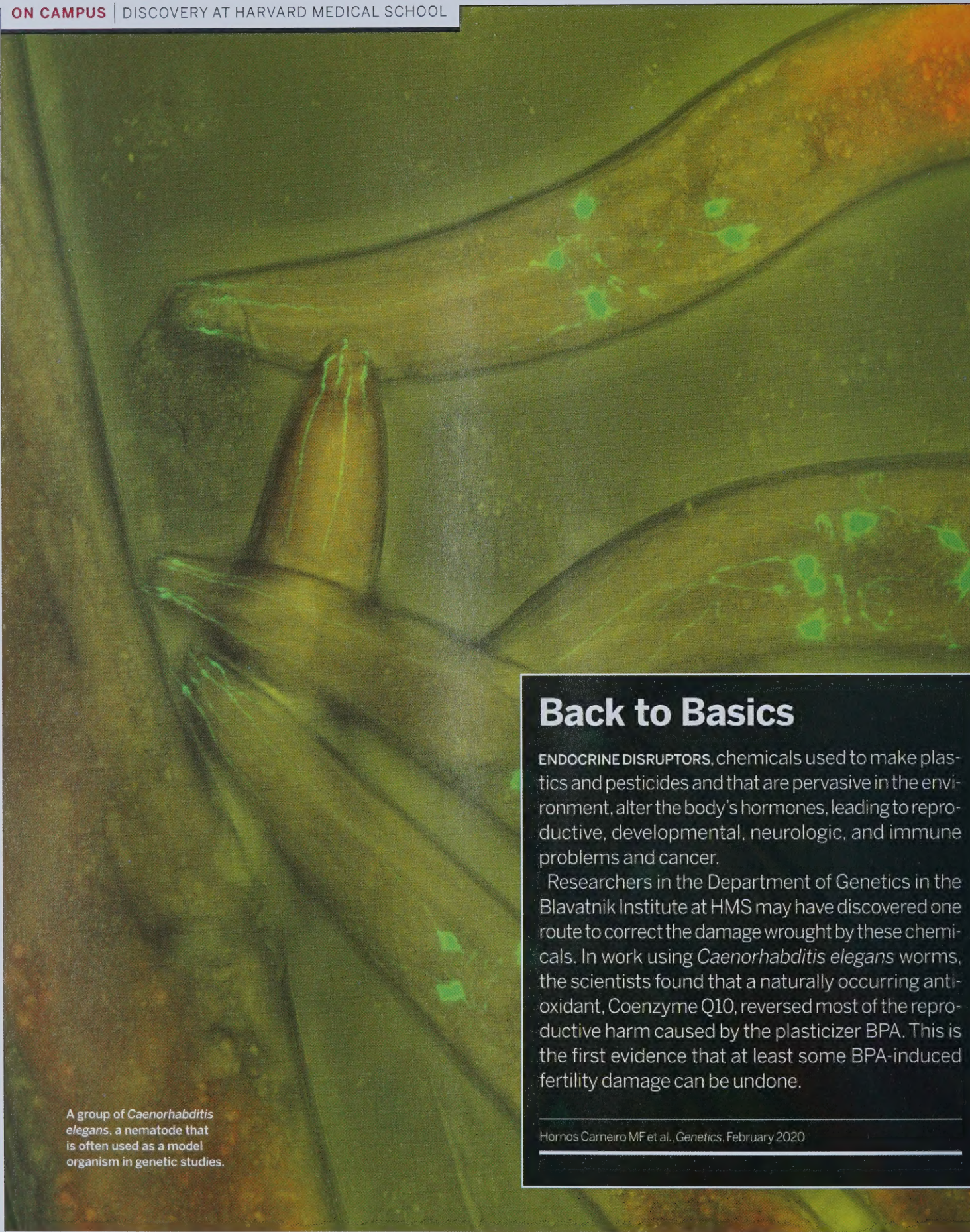
I want you to know how well the Winter 2020 issue of *Harvard Medicine* was received, not only in my "medically savvy" household, where I'm a retired nurse, my husband, **Kenneth Prager** (MD '68), is still a practicing pulmonologist and director of clinical medical ethics at New-York Presbyterian Medical Center, and one of our daughters is a nurse practitioner, but also by friends who noticed the magazine, picked it up, and became engrossed. One of them, whose perusal of this issue prompted me to call your office to request another copy, has a 25-year-old grandson he recently learned is trans. In some way, your articles were important to him, too.

So thanks for putting out such a well-written, timely, interesting issue. Keep it up!

REGENE PRAGER  
ENGLEWOOD, NEW JERSEY

*Ed: Thank you so much, Ms. Prager. Your note has made our day.*





A group of *Caenorhabditis elegans*, a nematode that is often used as a model organism in genetic studies.

## Back to Basics

**ENDOCRINE DISRUPTORS**, chemicals used to make plastics and pesticides and that are pervasive in the environment, alter the body's hormones, leading to reproductive, developmental, neurologic, and immune problems and cancer.

Researchers in the Department of Genetics in the Blavatnik Institute at HMS may have discovered one route to correct the damage wrought by these chemicals. In work using *Caenorhabditis elegans* worms, the scientists found that a naturally occurring antioxidant, Coenzyme Q10, reversed most of the reproductive harm caused by the plasticizer BPA. This is the first evidence that at least some BPA-induced fertility damage can be undone.

Hornos Carneiro MF et al., *Genetics*, February 2020



CARDIOLOGY

## Device may eliminate valve surgeries on babies

MORE THAN 330,000 CHILDREN WORLDWIDE are born with a heart-valve defect each year, and millions of others develop rheumatic heart disease requiring early valve replacement. Current prosthetic heart valves are fixed in size, so typically need to be replaced every few years as a child grows. For children receiving their first replacement before age 2, that can mean as many as five high-risk open-heart operations before they reach adulthood.

Now, HMS researchers at Boston Children's Hospital have created a new design for a prosthetic valve that could expand to meet the requirements of a child's growing heart. Modeled on the valves in the deep veins of the leg, the bileaflet device could be expanded as needed using a minimally invasive balloon catheter procedure.

The researchers tested the device using benchtop prototypes, computer simulations, and a large-animal model. The device functioned well across a range of sizes and, the team found, allowed good blood flow, which could reduce the potential for blood clots, often an unwanted side effect of existing prosthetic valves.

The team plans to submit its findings in support of initiating a clinical study of the device.

Hofferberth SC et al., *Science Translational Medicine*, February 2020

NEUROBIOLOGY

## Brain inflammation found in Gulf War Illness

A STUDY BY HMS SCIENTISTS at Massachusetts General Hospital has shown widespread inflammation in the brains of veterans diagnosed with Gulf War Illness, a condition that manifests in an array of symptoms, including fatigue, chronic pain, and cognitive problems such as memory loss. Gulf War Illness affects

## Systems Biology

### Irregular sleep patterns may increase cardiovascular risk



A study of a diverse group of nearly two thousand participants investigated how sleep patterns can disrupt the body's physiological rhythms by measuring participants' sleep duration and timing. The study, led by HMS investigators from Brigham and Women's Hospital, showed that over a five-year period, individuals who had the most irregular sleep experienced a twofold increased risk of developing cardiovascular disease compared to those with the most regular sleep patterns. The findings indicate that healthy sleep isn't just about quantity but also about variability and the important effect that can have on heart health.

Huang T et al., *Journal of the American College of Cardiology*, March 2020

about 30 percent of veterans who served in the 1991 conflict. Although the cause of the illness is unknown, researchers suspect several culprits: exposures to nerve gas and pesticides, the stress of extreme temperature changes, sleep deprivation, and physical exertion during deployment.

The study included twenty-three veterans, fifteen of whom had Gulf War Illness, and twenty-five healthy civilian subjects. Brain scans using positron-emission tomography imaging measured levels of a molecule that

increases in the presence of neuroinflammation. The scans detected little evidence of neuroinflammation in the healthy controls and the veterans who had not been diagnosed with Gulf War Illness, but did detect extensive inflammation in the cortical regions of the brains of veterans with the illness. Cortical regions are involved in executive functions such as memory, concentration, and reasoning.

The researchers speculate that neuroinflammation occurs because the central nervous system produces inflammatory molecules to destroy invaders such as bacteria and viruses. Although this response can be beneficial in the short term, it occasionally may become exaggerated, producing the high degree of neuroinflammation detected in study participants with the illness.

In previous research, the study team implicated neuroinflammation in a number of other conditions, including chronic pain, depression, amyotrophic lateral sclerosis, multiple sclerosis, and Huntington's disease. The new findings, they say, may help spur a more aggressive evaluation of neuroinflammation as a potential therapeutic target.

Alshelh Z et al., *Brain, Behavior, and Immunity*, February 2020

NEUROBIOLOGY

## Biomarkers may gauge ability to hear

A PAIR OF BIOMARKERS OF BRAIN FUNCTION may help explain why some people with normal hearing struggle to follow conversations in noisy environments, says a team of HMS researchers at Massachusetts Eye and Ear. One biomarker represents listening effort, and the other measures the ability to process rapid changes in frequencies.

This hearing difficulty, known as hidden hearing loss, refers to listening difficulties thought to arise from abnormal connectivity and communication of nerve cells in the brain and ear. Conventional hearing tests do not detect neural changes that interfere with how we process sounds at louder levels.



In an effort to detect hidden hearing loss, the researchers developed two sets of tests that they administered to a small group of young and middle-aged individuals with clinically normal hearing. One test measured electrical signals from the surface of the ear canal to capture how well the earliest stages of sound processing by the brain were encoding subtle but rapid fluctuations in sound waves. For the second test, participants wore specialized glasses that could measure changes in pupil diameter as they focused their attention on one speaker while others babbled in the background. Previous research showed that changes in pupil size can reflect the amount of cognitive effort expended on a task.

When the researchers combined the measures of ear canal EEG with changes in pupil diameter, they were able to identify which participants struggled to follow speech in a noisy setting and which didn't. Conventional testing could not account for either of these performance differences.

Parthasarathy A et al., *eLife*, January 2020

## IMMUNOLOGY

### Clue to personal care items and allergies found

CHEMICAL COMPOUNDS FOUND IN SKIN CREAMS and other personal care products can cause an allergic reaction on the skin, a condition known as allergic contact dermatitis. Although this condition is on the rise, particularly in industrialized countries, how these compounds trigger a reaction remains unknown.

Most allergic reactions involving T cells are attributed to proteins or peptide antigens that activate the immune system. It was thought, however, that chemical compounds in personal care products escape detection by T cells because they are smaller and structured differently than immune-triggering antigens and proteins. However, a study by a team of HMS scientists at Brigham and Women's Hospital and investigators at Columbia University in New York City and Monash University in Melbourne, Australia,

has changed that thinking. The team identified a new molecular mechanism that, when set in motion by common components of consumer products, triggers a T cell-mediated immune response. The mechanism is mediated by a protein called CD1a, a molecule in the immune cells that form the outer layer of human skin.

The researchers tested whether CD1a could bind directly to the allergens in personal care products and present these molecules to the immune system, eliciting a reaction. When they exposed T cells to material from skin patch testing kits, they found that T cells responded to certain substances, including balsam of Peru, widely used for fragrance in cosmetics and toothpaste. In addition, benzyl benzoate and benzyl cinnamate, substances in balsam of Peru, were directly responsible for stimulating the T cell response. Investigators also tested similar substances and found a dozen small molecules, including farnesol, that appeared to elicit a response. Crystallographic analyses showed that when farnesol forms a complex with CD1a, it kicks out naturally occurring human lipids, making the protein more visible to T cells and leading to T cell activation.

The authors note that while their work shows that fragrances in personal care products can directly initiate a T cell response, further investigation is needed to understand whether patients with allergic contact dermatitis commonly have T cells that recognize molecules like farnesol.

Nicolai S et al., *Science Immunology*, January 2020

## NEUROBIOLOGY

### Low protein seen in young men with autism

A NEUROIMAGING STUDY HAS SHOWN that the brains of young men with autism spectrum disorder have low levels of translocator protein, a substance that appears to play a role in inflammation and metabolism.

This discovery by a team of HMS researchers at Massachusetts General Hospital provides an important insight into the possible origins of autism spectrum disorder.

This developmental disorder, which affects one in fifty-nine children in the United States, emerges in early childhood and is characterized by difficulty communicating and interacting with others. Although the cause is unknown, growing evidence has linked it to neuroinflammation.

One sign of neuroinflammation is elevated levels of translocator protein, which can be measured in the brain using positron-emission tomography and anatomic magnetic resonance imaging.

The research team used these imaging tools to scan the brains of fifteen young adult males with the disorder. The group included both high- and low-functioning participants with varying degrees of intellectual ability. As a control, the team scanned the brains of eighteen non-autistic young men of similar age.

The scans showed that the brains of the young men with the disorder had lower levels of the protein, compared with the brains of non-autistic participants. In fact, those participants with the most severe symptoms of the disorder tended to have the lowest expression of the protein.

The brain regions found to have low expression of the protein have previously been linked to autism spectrum disorder and are thought to govern social and cognitive capacities such as processing emotions, interpreting facial expressions, and empathy.

The researchers point out that the translocator protein has multiple complex roles, some of which promote brain health. Adequate levels of the protein are, for example, necessary for normal functioning of mitochondria. Earlier research has linked malfunctioning mitochondria in brain cells to autism spectrum disorder.

Zürcher NR et al., *Molecular Psychiatry*, February 2020



## Fade to Gray

ANECDOTES HAVE LONG CONNECTED STRESSFUL experiences with hair-graying. The mechanism behind this graying has been elusive. Now, HMS researchers in immunology and stem cell and regenerative biology have discovered the molecular mechanism that triggers this change.

The researchers found that in the mouse model they studied, the cascade to grayness began when stress activated nerves that are part of the fight-or-flight response. These nerves then released norepinephrine, which was taken up by pigment-regenerating stem cells that reside in hair follicles. Norepinephrine kicked the stem cells into overdrive, leading them to convert into pigment-producing cells. This not only exhausted the reservoir of pigment-producing cells, it permanently damaged it. The result: unpigmented, or gray, hair.

Zhang B et al. *Nature*, January 2020



# noteworthy

## Alumna named dean for clinical and academic affairs

Psychiatrist and medical anthropologist Anne Becker, MD '90 PhD '90 (*fig. 1*), has been named the School's new dean for clinical and academic affairs. In this role, she oversees recruitment, faculty development, and academic and career advancement at the School. Her appointment began on April 1.

"I am thrilled that Anne agreed to take on this new role," said Dean George Q. Daley, MD '91, when announcing her appointment. "I know that she will bring scholarly rigor, creativity, and excellence that will be instrumental in this role."

Becker, the Maude and Lillian Presley Professor of Global Health and Social Medicine in the Blavatnik Institute at HMS, is an accomplished clinician and researcher who has been integral to the success of the School's Department of Global Health and Social Medicine. There, she created educational and research opportunities supporting student and faculty career advancement in the field of global health. Her research and clinical interests include the diagnosis and treatment of eating pathologies and the effect of social and cultural factors on eating disorder risk and development, mental health, and other health-risk behaviors. She is also the founder and past director of the Eating Disorders Clinical and Research Program at Massachusetts General Hospital.

As dean for clinical and academic affairs, Becker will be responsible for many of the initiatives, programs, centers, and institutes at HMS. She will manage partnerships and agreements with the School's affiliated hospitals and research institutions, including conducting clinical department reviews and promoting the integrity of the academic mission.

Becker also will serve as a key strategic partner and adviser to the dean, will coordinate the selection process for limited-competition funding offered through the School's Foundation Funds, and, in collaboration with the Office for Diversity Inclusion and Community Partnership, will support efforts that advance diversity programs and initiatives.

"The Harvard Medical School community is unparalleled in the exceptional talent of its faculty and in the commitment of the School and its affiliate institutions to research and teaching excellence, clinical innovation, and service," Becker said. "It is a great privilege to join the HMS leadership team."

## International coronavirus research collaboration launched

In February, a five-year Harvard-China research initiative to tackle SARS-CoV-2 (*fig. 2*) was launched. Its aims: develop therapies to prevent infections of this new coronavirus, design treatments to alleviate symptoms of the disease COVID-19, and prepare for future global outbreaks. The initiative is led by HMS scientists and includes researchers at the Harvard T.H. Chan School of Public Health and the Guangzhou Institute of Respiratory Health. As of late May, sixty-two research proposals have been awarded support. Their funding derives from the initiative's initial grant from the China Evergrande Group, a Fortune Global 500 company based in China, and other gifts since received.

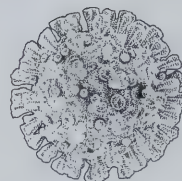
Since its identification in December, this coronavirus has become a global threat, taking a toll on human health, overwhelming vulnerable health care systems, and destabilizing economies worldwide.

Led by Dean George Q. Daley, HMS serves as the hub for basic scientists, translational investigators, and clinical researchers working throughout the medical school and its affiliated hospitals and institutes, along with other regional institutions and biotech companies. The Chinese effort centers at the Guangzhou Institute of Respiratory Health under the direction of Zhong Nanshan, a renowned pulmonologist and epidemiologist. Zhong is also head of the Chinese 2019n-CoV Expert Taskforce and a member of the Chinese Academy of Engineering.

The overarching goal of the collaborative is to elucidate the basic biology of this virus and its behavior and to inform disease detection and therapeutic design. The main areas of investigation will include the development of rapid, more accurate diagnostic tests, including point-of-care testing; understanding the



*fig. 1*



*fig. 2*



*fig. 3*

body's immune response and host-pathogen interaction, including identification of biomarkers to monitor the course of infection and disease progression; development of vaccines to prevent infection; development of antiviral therapies that shorten the duration of the illness and mitigate symptoms; and development of treatments for those with severe disease.

## Therapeutics Initiative welcomes executive director

In January, Mark Namchuk (*fig. 3*) stepped into a newly created position at HMS: executive director of therapeutics translation for the School's Therapeutics Initiative. The recently launched initiative supports the School's strong culture of discovery in the basic mechanisms of biology and disease and their application to new treatments. Namchuk, a seasoned scientist with a background in immunology and bioorganic chemistry, will focus on establishing the critical infrastructure required to fuel research advances while also training the next generation of therapeutics investigators.

"Harvard Medical School is privileged to be able to recruit someone with the depth and breadth of Mark's industry expertise," said HMS Dean George Q. Daley regarding Namchuk's acceptance of the appointment. "I believe his arrival will invigorate the translational research efforts across our community, encompassing researchers in the Blavatnik Institute on the Harvard Medical School campus and at our fifteen affiliated hospitals and research institutions."

Namchuk came to HMS from the biopharmaceutical firm Alkermes, where he served as senior vice president for research, and pharmaceutical and nonclinical development. He has been a leader in drug discovery and development for more than 20 years and has worked on research and development programs in a number of therapeutic areas, including cancer, cystic fibrosis, depression, immune modulation, infectious diseases, multiple sclerosis, pain, and schizophrenia.





## B A N D O PER CAUSA DI CONTAGGIO

**P**Remendo gl' Illustrissimi Signori Presidenti alla Sanità della Città di Reggio di tener lontano, & assicurarsi al possibile, con l'aiuto di Sua Divina Maestà, del Glorioso S. Prospero suo principal Protettore, & altri Santi Tutellari, da ogni sospetto di Contagioso morbo, ad esempio delle sue Città corrispondenti, & altre, con partecipazione del Serenissimo Sig. Principe Luigi d' Este Governatore di questa Città, suo distretto, e Ducato sospendono fin' à nuovi ordini à causa di mal contagioso il Commercio con la Città di Malta, & Isola, e loro Territorij, e Giurisdizioni, insieme con tutte persone, animali, e cose, denari, lettere, e qualsivoglia altra cosa, che da detta Città, e Luoghi venisse, o fosse portata in qualunque modo, tanto per terra, quanto per acqua, o c' hauesse poco, o molto toccato anche per transito detta Città, o suo Territorio, con fede, o senza, sotto pena della vita, confiscatione de' beni, e perdita d' ogni sorte di robbe, danari, merci, animali, carra, carrozze, o altre cose come di sopra, che contro la forma del presente Bando fossero condotte, o in qualsivoglia modo portate in questa Città, suo Distretto, e Ducato.

Nelle quali pene s' intenderano incorersi Albergatori, Osti, e tutti quelli, che mandaranno, daranno, o faranno dar recapito, o alloggiamento à dette persone, robbe, o c' haueranno parte benchè minima in qualsivoglia trasgressione del presente Bando; Incorreranno parimenti nell' istesse pene Carrozzieri, Mulattieri, Vetturini, & ogn' altro, c' hauesse ardire in qualsivoglia modo, sotto qualsivoglia pretesto, o colore caricare, o far caricare, condurre, o far condurre persone, bestiami, merci, lettere, & ogn' altra sorte di robbe, che venessero da detta Città di Malta, suoi Territorij, o gli hauessero come sopra toccati, applicando le confiscationi, & ogn' altra robba per vn terzo alla Serenissima Ducal Camera, per l' altro terzo all' Accusatore, o Invenitore, che sarà tenuto segreto, e l' altro all' Vffizio di Sanità.

*Publicata alla solita Arreghiera li 12. Marzo 1676.*

SIGNORI DEL MAGISTRATO.

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Sig. Capitano Loujico Signoretti.

Sig. Giuseppe Maioli.  
Sig. Conte Abbondio Pallà.

Vespesiano Calcagni Cancell.

IN REGGIO, per Prospero Vedrotti.

## The presence of contagion

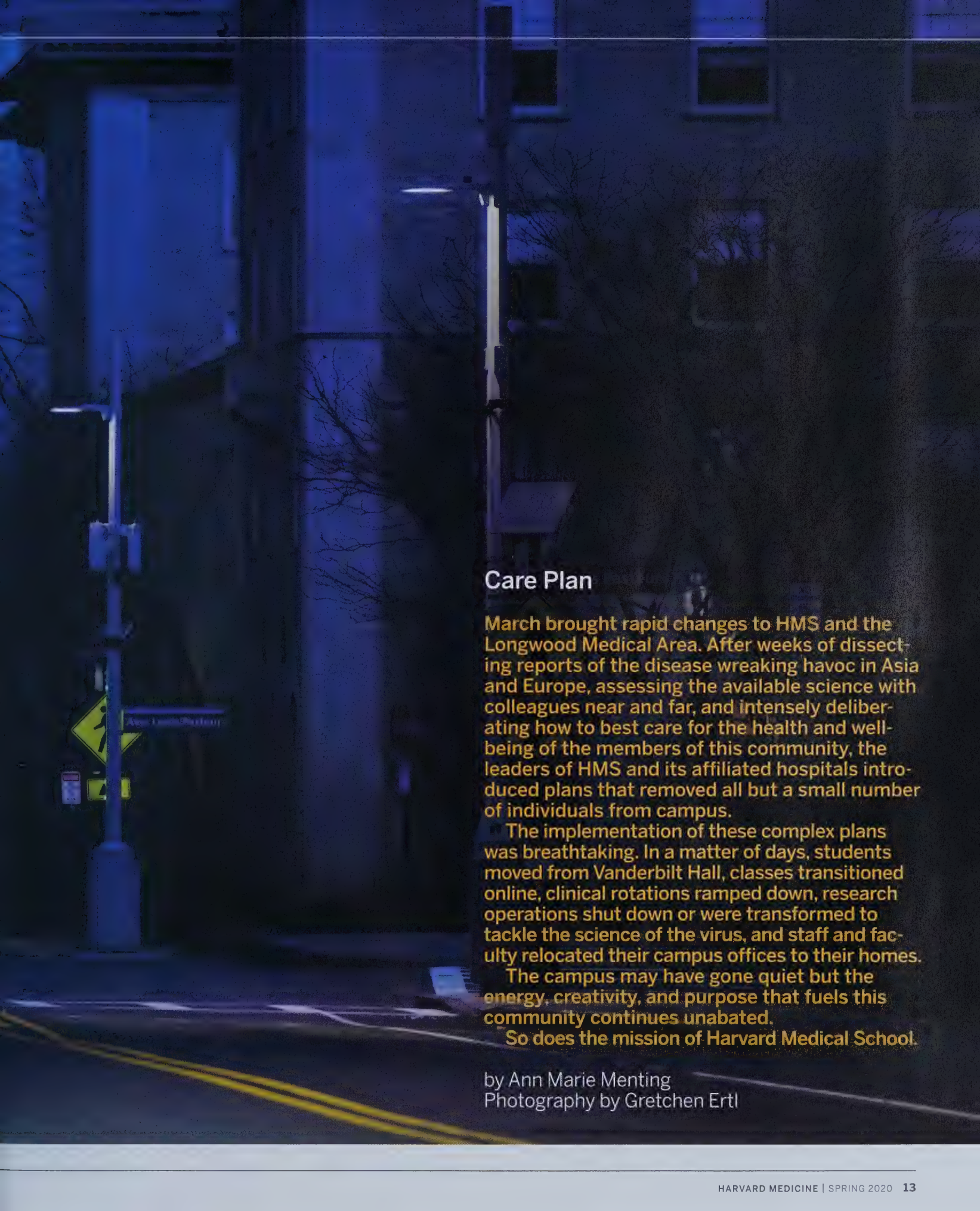
Disease can enter a country in many ways. According to scholars, the 1675-76 plague on the small Mediterranean island of Malta arrived on a ship carrying textiles: The first victims were in the home of a merchant who had received a consignment of cloth from the vessel. An inability to recognize its presence hampered early action to contain it. Efforts to mitigate its spread were varied and included posting knights in urban centers to control people's movements and tacking notices of contagion at entry points to towns and cities. The cost of hesitation was high. By the time the last pestilence-related death occurred in the early fall of 1676, some 11,300 of an estimated 60,000 islanders had perished.



“Although many research projects have been slowed, as a research institution, we are up and running.”

—HMS DEAN GEORGE Q. DALEY, MD '91, TOWN HALL ADDRESS, 4.10.20





## Care Plan

March brought rapid changes to HMS and the Longwood Medical Area. After weeks of dissecting reports of the disease wreaking havoc in Asia and Europe, assessing the available science with colleagues near and far, and intensely deliberating how to best care for the health and well-being of the members of this community, the leaders of HMS and its affiliated hospitals introduced plans that removed all but a small number of individuals from campus.

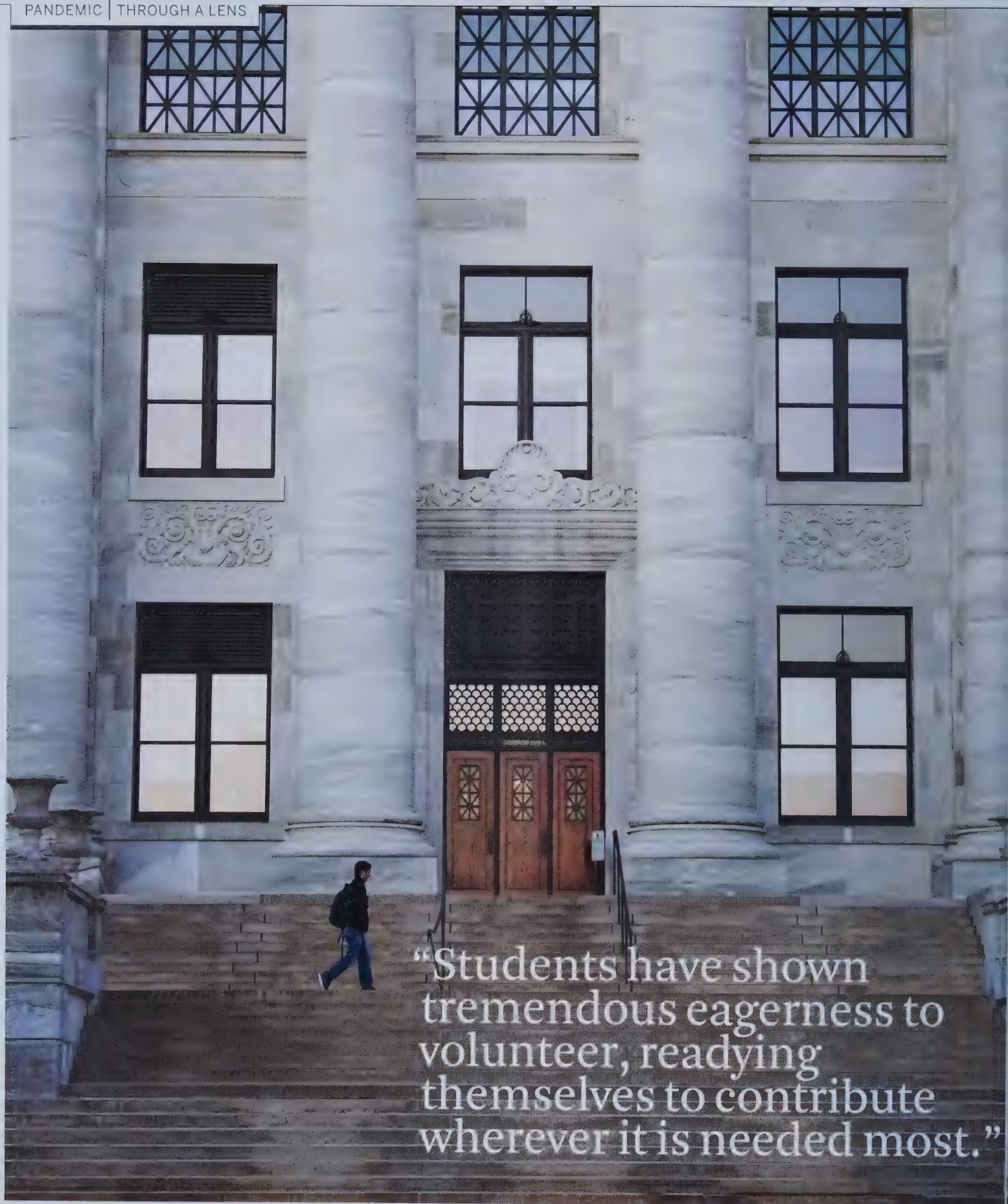
The implementation of these complex plans was breathtaking. In a matter of days, students moved from Vanderbilt Hall, classes transitioned online, clinical rotations ramped down, research operations shut down or were transformed to tackle the science of the virus, and staff and faculty relocated their campus offices to their homes.

The campus may have gone quiet but the energy, creativity, and purpose that fuels this community continues unabated.

**So does the mission of Harvard Medical School.**

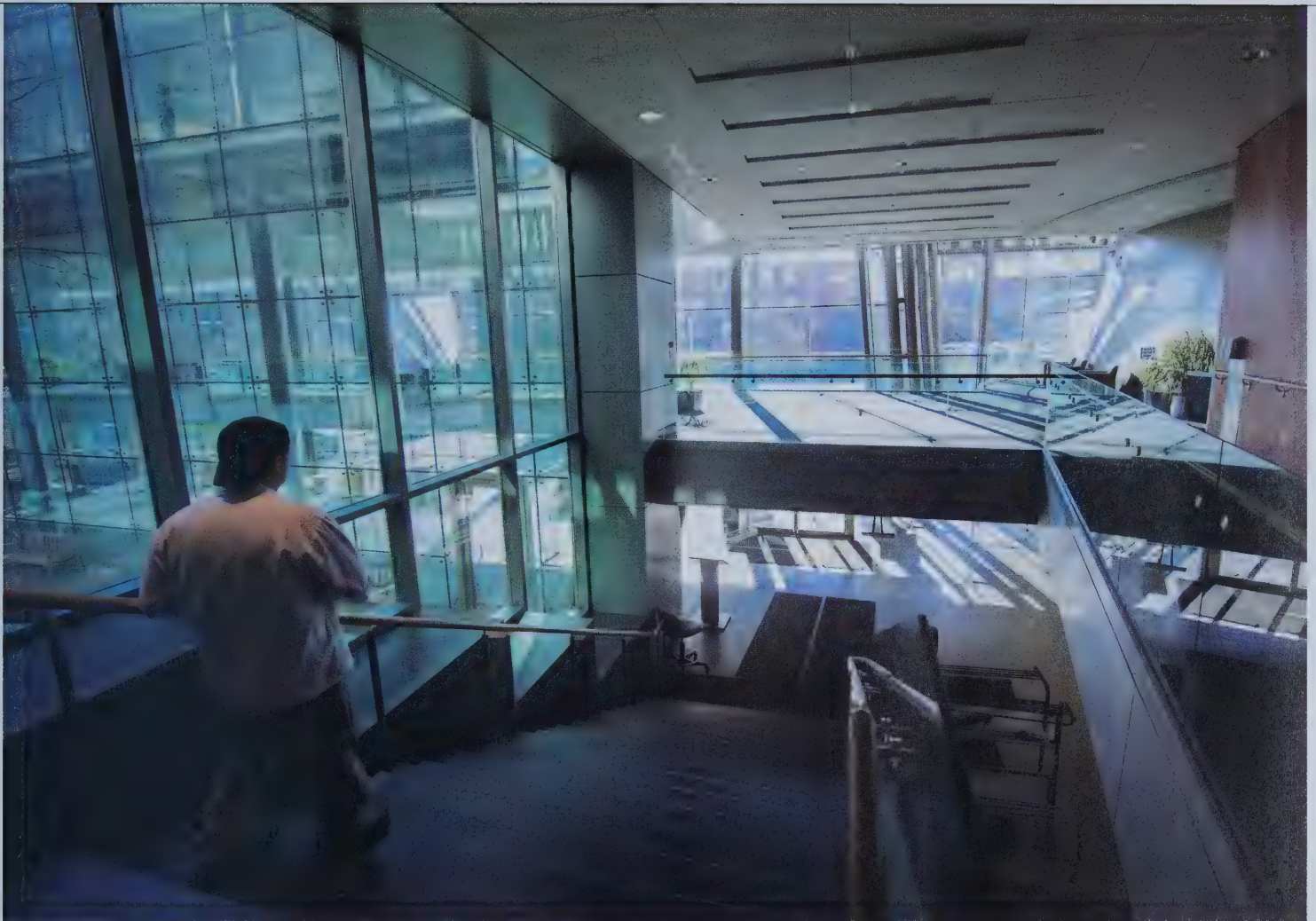
by Ann Marie Menting  
Photography by Gretchen Ertl





“Students have shown tremendous eagerness to volunteer, readying themselves to contribute wherever it is needed most.”






In his messages to the HMS community, Dean Daley notes with particular pride the contributions of our medical students during this pandemic. What began as a grassroots initiative sparked by a handful of students has been fanned into flames of hope and help for patients, health care providers on the frontlines, and medical students worldwide. Their work includes answering patients' calls to hospitals, providing childcare for hospital medical staff, and developing COVID-19 information for the public and translating it into multiple languages. The students also banded together to develop a COVID-19 curriculum for HMS students. When posted online, the peer- and faculty-reviewed curriculum spread globally and, by late May, had been adopted by medical schools in more than one hundred countries.

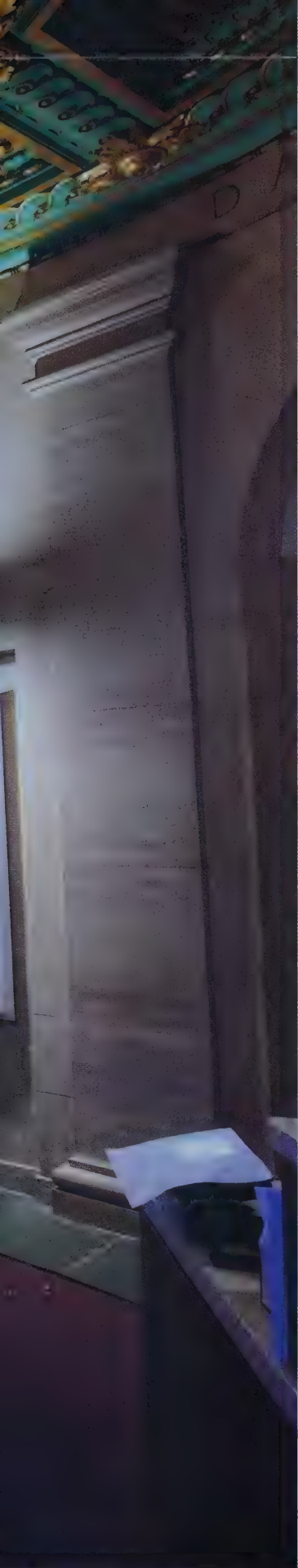






“It is in times of crisis that the highest ideals of perseverance, generosity, spirit, creativity, and grit reveal themselves.”





As part of its planning for the safety and well-being of all who work on campus, HMS leadership announced in late March that it was working to ensure that contract personnel in dining, security, parking, and custodial services would not be harmed by disruptions brought about by pandemic-related shutdowns to campus operations. Although some workers would remain on-site as essential personnel, many others would not, which could have financial repercussions for them. Harvard's decision to safeguard these workers resulted in a pact to provide them with financial relief in the form of pay and benefits through the end of June.

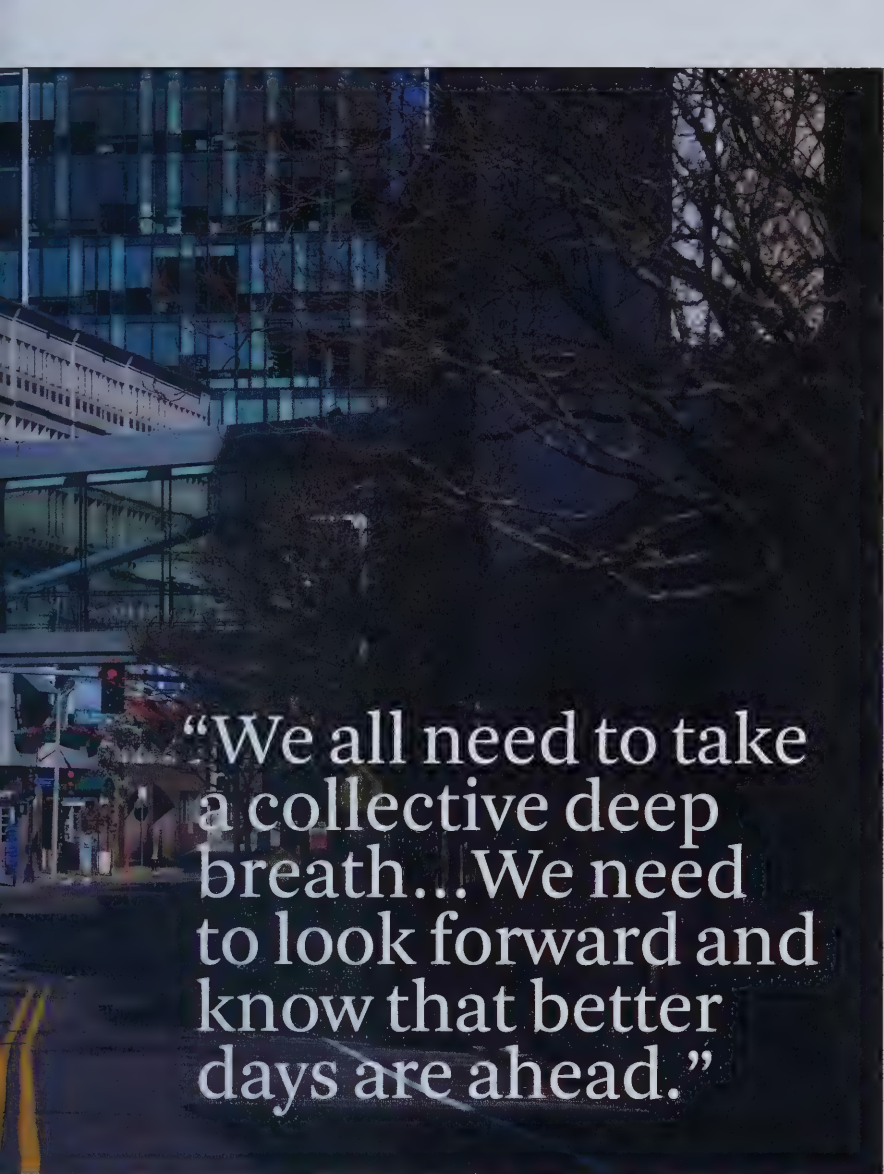




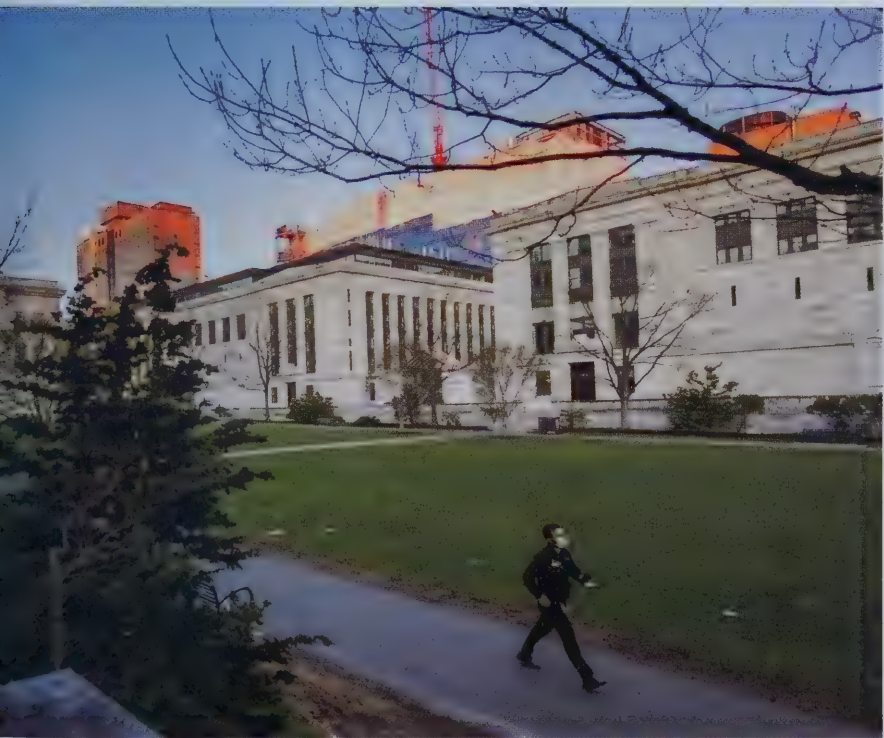


Following the shutdown of the Quad's labs, most HMS postdocs found themselves at home, balancing grant writing and data analysis with childcare and homeschooling. Because many of these young scientists are at critical career junctures, an unprecedented number are attending online professional and career development courses being offered by the Office for Postdoctoral Fellows. Although these young researchers may worry about job prospects, they remain focused on being well-prepared to become the next leaders in science.





“We all need to take a collective deep breath... We need to look forward and know that better days are ahead.”



WHEN WRITING TO ALUMNI to announce the cancellation of Reunion Week, Dean George Q. Daley, MD '91, neatly summed up recent transformations at HMS.

“This pandemic has forced us to make a world of change in just a matter of days.”


Yet those changes, as encompassing as they are, have not stopped the work of the School. Medical education continues with students taking classes online and participating in a growing number of virtual clerkships being rolled out or developed. Advocacy among our MD candidates has spiked. Understandably, most of it has been focused on projects related to COVID-19 that are taking root in the Boston area. But students who are dispersed throughout the nation also are tackling the health care inequities facing vulnerable populations, inequities that have only been growing during this pandemic.

The number of graduate students, postdocs, faculty, and staff in the School's scientific enterprise decreased significantly by a ramp-down of research operations. Knowing that certain operations, such as essential experiments and animal care, would need to continue, HMS leadership established a way for department chairs, working with heads of their laboratories, to identify key individuals who would perform these functions if approved to do so. Petitions were reviewed and decided upon by a committee led by the dean. The process brought abrupt, heartbreaking endings to many multiyear experiments, yet the research community met the challenge and ramped down effectively and efficiently, helping to ensure the safety and health of all.

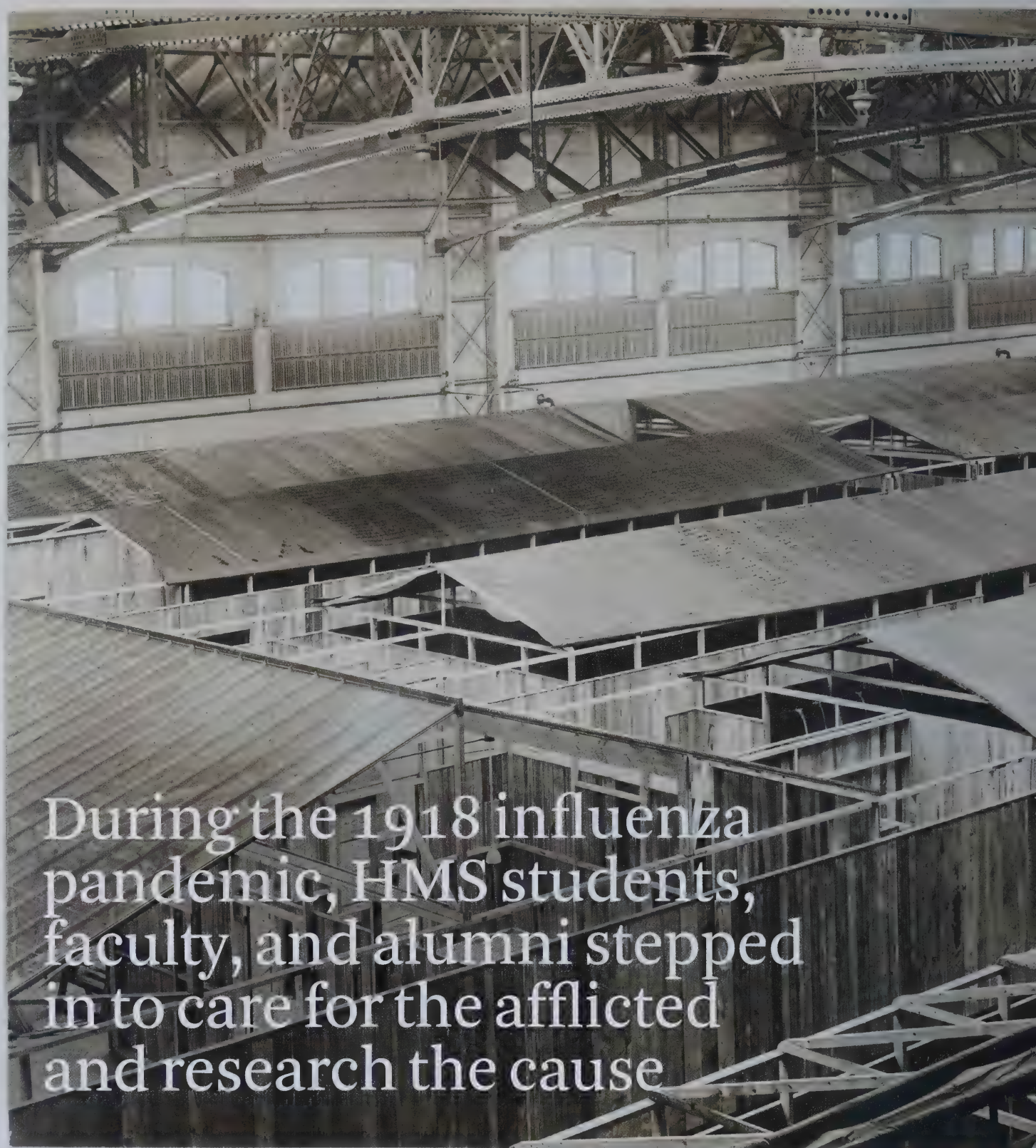
Among the researchers allowed to stay active on campus are several whose work is directly related to SARS-CoV-2 or COVID-19. One initiative focusing on the virus is the Massachusetts Consortium on Pathogen Readiness (MassCPR), born at HMS and now involving scores of clinicians and researchers from leading Massachusetts academic research institutions and from several area pharma and biotech companies. An initial call for research proposals netted 448 applications. Sixty-two have been funded, their support drawn from an initial grant from the China Evergrande Group and other gifts made since.

The School continues to deliver on its mission of service, too. Bioethics faculty were key to formulating the Crisis Standards of Care to guide how resources would be rationed in Massachusetts hospitals should the number of patients outstrip inventories of critical equipment. Other faculty have convened mental health experts from across our affiliates to plan how to alleviate the psychological burdens of frontline clinicians.

The School's vast alumni community is serving in countless ways. Some have come out of retirement to deliver care in hospitals or remotely; many were already in hospitals, caring for patients with the disease. Others have been making personal protective equipment or conducting clinical research on the disease. Still others are serving on COVID-19 advisory groups at the local or national level, holding town halls, or contributing their expertise in media interviews or online education series about the disease and its challenges for health care.

This spring, the world may have changed on campus, but the spirit of the people of HMS hasn't. 





During the 1918 influenza pandemic, HMS students, faculty, and alumni stepped in to care for the afflicted and research the cause





The Commonwealth Armory in Boston was converted into a military hospital during the 1918 flu pandemic, a transformation documented in December 1918 in the *Boston Transcript*.

U.S. NATIONAL ARCHIVES CATALOG. 165 WW-269B-59

## In the Grip of a Disease

BY ELIZABETH GEHRMAN



HARVARD PRESIDENT A. Lawrence Lowell was faced with a dilemma. It was toward the end of World War I, and a severe pandemic had roared into Massachusetts. Should the University hold classes as scheduled?

Lowell consulted with medical school faculty. Henry Asbury Christian, the Hersey Professor of the Theory and Practice of Physic, “felt as you do,” Lowell wrote to his cousin Joseph Lee, of Cohasset, in September 1918, “that we had better postpone the opening. On the other hand, Doctor Rosenau

thinks it would be a mistake for us not to open on time,” referring to Milton Joseph Rosenau, a professor of preventive medicine and hygiene at the School.

Lowell laid out the case for both options, ultimately concluding that “as the epidemic has spread all over the country, there would be no increased exposure from bringing the students here.” So the fall term began on schedule, with a few restrictions, including the suspension of classes of more than fifty students.

The Spanish flu—so named because neutral Spain’s early mortality reports, undiminished by military censors, made the country seem especially hard-hit—first appeared in March 1918, with a deadlier second wave starting in the fall of that year and lasting until the spring of 1919. Lesser recurrences popped up as long as three years later. The avian-derived H1N1 virus that caused this pandemic would ultimately infect around 500 million people, or a third of the world’s population, and contribute to as many as 100 million deaths—up to five times as many as “the war to end all wars.”



## Two by sea

Greater Boston was ground zero for the contagion's resurgence in the United States. On Tuesday, August 27, two U.S. Navy seamen stationed at Commonwealth Pier were admitted to the sick bay with flu-like symptoms. By the end of the following day, eight more sailors had joined them. On Friday, fifty-eight beds were filled, and within a week hundreds of new cases were crowding waterfront infirmaries. Morgues were at or beyond capacity, and gravediggers were seen dumping the dead into the ground unprotected so their caskets could be used again. The flu struck its victims like a bolt from the blue, with people who weren't attentive to subtle symptoms sometimes reported collapsing mid-stride.

Proximity put HMS students and faculty on the frontlines in the battle against the disease. Even as their classmates and colleagues became involved in the conflict, those who remained at home attended to

## Fourth-year students suspended their class-work to help look after their peers, around sixty of whom were in the College's infirmary.

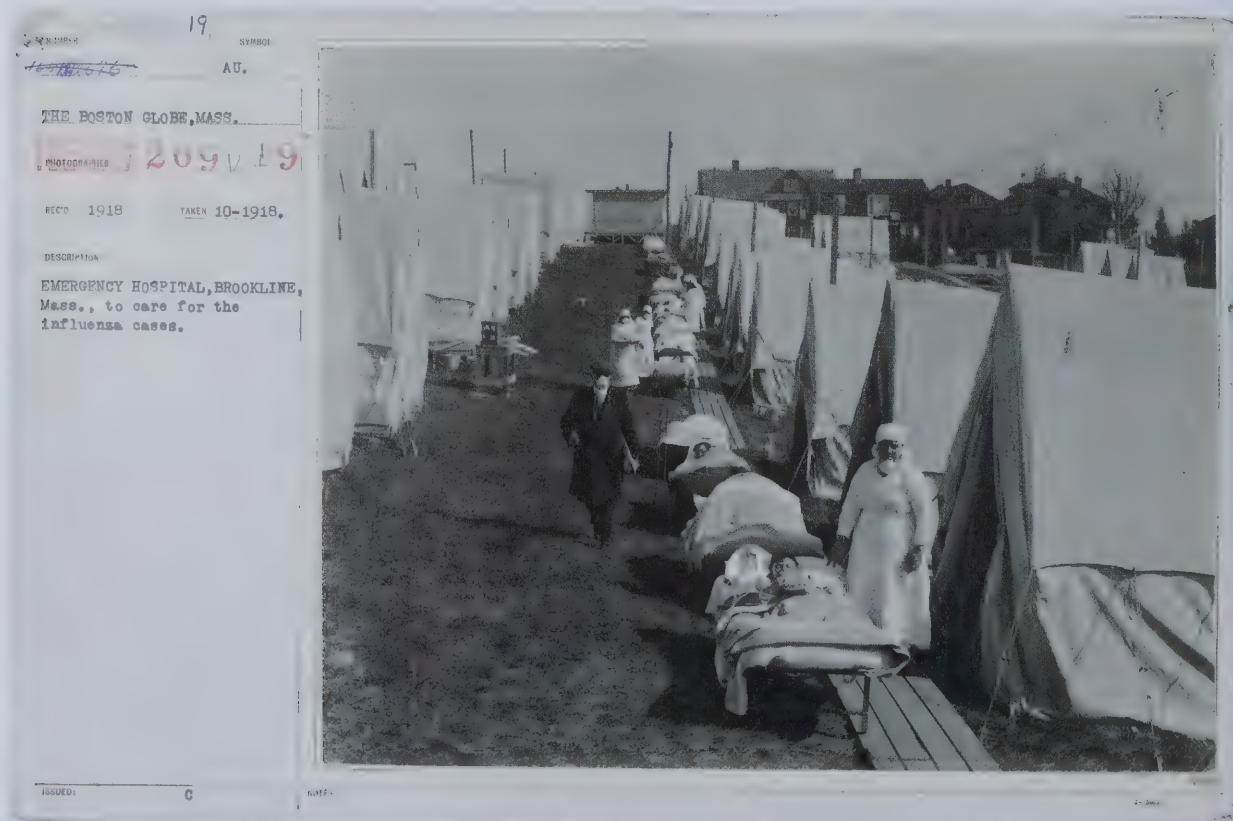
patients, educated the public, and delved into the etiology and treatment of this calamitous new phenomenon.

"The devastating epidemic of influenza not only imposed upon the teaching force and students their share of illness and incapacity for work," wrote David Edsall, the freshly appointed dean of HMS, in his 1918 annual report, "it has made also extraordinary demands upon all the clinical teachers in meeting the universal need for medical care and it led to a public call for assistance from senior medical students which the students met promptly and admirably."

Fourth-year students suspended their classwork to help look after their peers, around sixty of whom were in the College's Stillman Infirmary by October with "the grip," as influenza was then commonly called. By the time the spring semester began, five of the hospitalized students had died, along with three teachers.

About a dozen fourth-years were installed as medical officers in various posts around campus. One oversaw the infirmary; of the others, the *Harvard Crimson* reported, "one is in charge of the suspected cases isolated in Standish Hall, one is acting as special assistant to Dr. Bailey, University physician, and another is stationed at the Locker Building, where the [U.S. War Department's Student Army Training Corps'] physical examinations are being held, to watch for new cases."

HMS students set to graduate that year were also conscripted by various towns and cities around Boston. "We have received splendid reports from physicians with whom these students have worked," wrote J.J. Carroll of the Emergency Health Committee for the State Committee on Public Safety, to Edsall in late October, after the students were released from duty. "They have been faithful and conscientious and we are most grateful for their assistance during the past few weeks."





The Administrative Board voted that these absent students should receive a “pass mark” for their section work that term, though they were still on the hook for exams.

### Catalog of symptoms

In early September, Edwin Allen Locke, MD 1901, an HMS assistant professor of medicine, set up an influenza ward in the South End’s Boston City Hospital, which treated 2,300 patients. Among the 675 who died were nine of eighty nurses infected and two of twenty sick doctors.

“Too much cannot be said for the heroism of our physicians and nurses who, despite depleted numbers owing to the war, worked on under conditions beyond description,” wrote the hospital’s board of trustees in that year’s annual report.

The conditions may have been hard to describe, but Locke, George E. Rönne, MD 1918, and Herman Lande, MD 1918,

**The overall mortality rate of 2 percent shot to nearly 52 percent for those with flu complicated by pneumonia.**

recounted for the flu itself a “picture of unusual definiteness” in a January 1919 paper based on their “intensive study” of patients seen in the hospital’s Harvard Teaching Service.

The paper, published in the *Boston Medical and Surgical Journal*, noted that 68 percent of the cases of this “acute catarrhal infection of the respiratory tract” occurred in patients between 20 and 40 years old, and that the overall mortality rate of 2 percent shot to nearly 52 percent for those with flu complicated by pneumonia. Among the symptoms were chills, headache, and “profuse sweats,” “malaise and prostration,” “constant agonizing pains in the back, legs and frequently in the joints,” “very acute hyperalgesia of the skin,” and a “burning pain under the sternum which might be felt from the larynx to the lower limits of the thorax” and which was “greatly aggravated by cough.” Their depiction of those with

secondary pneumonia was even more grim, and included “overwhelming toxemia” leading to delirium or, more often, stupor, and nausea, extreme bloating, gas, and sometimes “very violent” diarrhea. The intense cyanosis that led to the flu being nicknamed the “Purple Death” was the “most important single prognostic sign [of] ... almost certain fatal termination.”

Locke and his colleagues had no cure at their disposal but noted a treatment that “yielded results which are most striking” when employed by the doctors who had devised it at the Chelsea Naval Hospital. The preliminary report from the Navy’s Lee W. McGuire, a lieutenant commander, and Medical Corps Lieutenant William Rufus Redden, MD 1917, appeared in the October 1918 issue of the *American Journal of Public Health*. The report documented their work injecting patients with serum from those “convalescing from pneumonia, following



Media coverage in 1918 of the influenza pandemic in Massachusetts documented an emergency hospital in Brookline, in October in the *Boston Globe* (far left); the city’s Commonwealth Armory after conversion into a military hospital, in the *Boston Transcript* in December (above); and Brookline’s Correy Hill Hospital, in September in Chicago’s *Western Newspaper Union*.







Red Cross workers in Boston are shown making and bundling face masks for U.S. soldiers in this March 1919 photo, credited to the International Film Service.







## Student Perspectives

### Ahmed Ahmed

FOR FIRST-YEAR MEDICAL STUDENT Ahmed Ahmed, the social and health inequities revealed by the COVID-19 pandemic are personal.

"It highlights how much we're missing in terms of public health and a social safety net within our society," he says. "Even the assumptions embedded in our recommendations hit close to home for me."

Ahmed was born in a Kenyan refugee camp after his family fled Somalia's civil war, and he arrived in the United States as an infant in 1996. His parents initially settled in Maryland, but at age 7, he moved with three siblings and his mother to Rochester, Minnesota. It was there that Ahmed grew attentive to socioeconomic differences.

"I remember visiting a friend's house when I was 12," he says. "We went into their kitchen to grab a snack, turned on the lights, and that's when I learned not every house in America had cockroaches."

Rochester is home to the Mayo Clinic, where "most of my friends' parents worked as doctors and nurses, and my mom worked as a dishwasher." It made for hard times financially, but Ahmed is proud of his mom's work.

"Her efforts inspired my own drive," he says. "Society doesn't always place a high premium on her work, but we see how essential it is in times like these."

Ahmed reciprocated his mother's efforts by excelling academically. He graduated from Cornell University with a degree in biology and spent two years at the University of Oxford as a Rhodes scholar. When he chose Harvard for medical school, his mother "was just beaming with joy," he says. "It was the first time she recognized the name of the school I was going to attend."

Now, as part of the dispersed class of HMS first-year students, Ahmed is in New Jersey working to help vulnerable groups during the pandemic. He recently helped organize a webinar with Nancy Oriol, MD '79, that brought together more than 330 mobile health clinic leaders from around the country.

"Mobile clinics uniquely reach vulnerable groups, including the uninsured, the underinsured, and the undocumented," Ahmed notes. "In crafting COVID-19 responses, it's important that we don't leave these groups behind." Ahmed and Oriol recently co-published an opinion piece in which they called for equity in the fight against COVID-19.

Ahmed hopes to continue working at the intersection of clinical medicine, public policy, and higher education. "If I don't allow myself to give up any of those passions," he says, "I can have a career in all three." —Elizabeth Gehrman





EMMA KOROLIK (OPPOSITE); COURTESY OF XAVIER DU MAINE

### Xavier du Maine

XAVIER DU MAINE MISSES HIS LABORATORY.

"I do mouse research, so the quarantine is going to delay my experiments," he says. "But it's giving me more time to think about my science so that when we get back, I can hit the ground running."

Du Maine is using the time away from the lab to get a jump on his dissertation and a paper he's preparing for publication. He's not someone who likes to be idle: In addition to working as a biological and biomedical sciences PhD candidate in the laboratory of HMS neurobiology professor Chenghua Gu, he is a member of Underrep-

resented Scholars in Neuroscience, Minority Biomedical Scientists of Harvard, and the Christian Medical and Dental Association. Last year, he was named a Diversity and Inclusion Fellow in Harvard's Graduate School of Arts and Sciences.

As a biology undergraduate at Columbia University, the St. Louis native spent one summer studying ALS at Washington University and another researching Alzheimer's disease at UCSF, but when Harvard's Summer Honors Undergraduate Research Program unexpectedly paired him with Dragana Rogulja, an assistant professor of neurobiology in the Blavatnik Institute at HMS, and into the lab of Rogulja's frequent research collaborator, HMS neurobiologist Michael Crickmore at Boston Children's Hospital, he shifted gears academically. The two scientists "just live and breathe science," says du Maine. "Their passion and enthusiasm were contagious." They sparked his interest in basic science and his desire to study it "at Harvard in particular."

Du Maine is now looking at cellular pathways in the blood-brain barrier. "I love it because it straddles the line between basic and translational neuroscience," he says. "Research like this can have a huge impact, because as much as we don't know about diseases and how they work, multiply that by one hundred and that's how little we know about the fundamentals of how the brain works."

As fascinating as du Maine finds academic research, his goal is to use his PhD as a stepping-stone to an administrative position in higher education.

"What really changed my perspective was becoming a GSAS diversity fellow," he says. "We address issues related to creating an inclusive community across the graduate schools." He thinks he can leverage the early difficulties he faced as a minority STEM student to help "celebrate everyone's differences and allow them to thrive."

Meanwhile, the student groups he belongs to and his Christian faith have "been a foundation for me," he says. "When things get rough and really dark, they are absolutely crucial for maintaining my sanity, putting things in perspective, and reminding me there's a greater purpose." —Elizabeth Gehrman





### Jie Jane Chen

WHEN YOU'RE PREPARING to complete medical school and planning for the coming months, you can become a bit disoriented if all those plans come to a screeching halt. Yet, if you "learn to lean in," says fourth-year medical student Jie Jane Chen, you can embrace the challenges and grow. For Chen, gratitude and connection are key.

"I am thankful for many people in my life who are sources of encouragement and strength," says this California native, "and for the opportunities to stay in touch despite being physically apart."

Chen began to see the effects of the pandemic on her family and patients months ago. In January, word from concerned family members led her father to cancel a planned visit to China. In February, when Chen was in Madrid doing a gastroenterology rotation at Hospital General Universitario Gregorio Marañón, which is affiliated with Universidad Complutense de Madrid, the first case of the novel coronavirus emerged in Barcelona. Soon her hospital implemented additional precautions. By mid-March, her psychosocial oncology and palliative care rotation at Brigham and Women's

Hospital/Dana-Farber Cancer Institute had gone virtual.

"It's heartbreaking to see how the new rules limiting visitors in hospitals and hospice facilities affect patients and health care teams," says Chen. She chose to focus on providing assistance to those on health care's frontlines who need child care or other support and on counseling patients with COVID-19 symptoms about home care.

Fostering such connections fits right into Chen's interests in improving the quality of patient care and strengthening community among medical professionals. Before the American Radium Society's conference was postponed, for example, she had planned to present her findings on patient-provider communication and decision-making, along with patterns of palliative care among patients receiving palliative radiotherapy. Three years earlier, she cofounded Weave, a novel tool for connecting students and faculty interested in developing mentoring relationships. It won the School's 2019 Program Award for a Culture of Excellence in Mentoring and the 2019 Dean's Innovation Award in Diversity and Inclusion.

Now Chen is poised to meld her interests in clinical research and education with work as an academic radiation oncologist. Before coming to HMS, she coordinated clinical trials in the Stanford Cancer Institute's Department of Radiation Oncology; in March, she matched in radiation oncology at the University of California, San Francisco.

Meanwhile, she's reflecting on her role in medicine and the ongoing pandemic as a soon-to-be intern.

"I'm now trying to lean into everything as it happens, to be a source of emotional support for people, and to build community and resilience where I can." —Ann Marie Menting





### Victor Lopez-Carmen

THERE IS A STRONG AND INTRICATE WEB of connections that binds Victor Lopez-Carmen to generations of his people.

"We consider ourselves as one generation of many," says the first-year medical student. "I belong to this generation and work to build something better for the next. We all build off the work of our ancestors."

Lopez-Carmen, who is a Dakota of the Crow Creek Sioux Tribe and also Yaqui, lives and breathes the responsibilities that come with these interlaced connections. In mid-March when he and other first-year students moved off campus as part of the School's pandemic response plan, Lopez-Carmen headed to his brother's home in California, not his family's home in Tucson, Arizona.

"I did not want to risk going to my community," he says.

Lopez-Carmen became acquainted with HMS through the Four Directions Summer Research Program, an opportunity the School and Brigham and Women's Hospital offer to students who are committed to improving the health of Native American communities. For Lopez-Carmen, improving Native American health care is not simply a commitment, it is the passion that has fueled his work for years. And it is the passion that led him to pursue medicine as a career.

"I know the beauty in our culture, but I also know of the unending trauma that colonization has subjected it to for centuries by undermining Indigenous systems of self-reliance, including for health care," he says. "I wanted to figure out what was going on and how I could help."

Lopez-Carmen has been helping at both national and international levels. After graduation from college, he received a Fulbright scholarship to work with Aboriginal peoples in Australia, where he also earned a master's in public health. When he returned to the United States, he worked on the House Natural Resources Committee with Arizona Rep. Raúl Grijalva.

For the past six years he has worked with the UN Global Indigenous Youth Caucus, a role he began during his undergraduate freshman year. He was elected coordinator for the group's North American region and, today, is the co-chair of this UN caucus. He's now on the student leadership committee for the HMS COVID-19 Student Response effort and is leading its COVID-19 Indigenous Health Campaign.

He says work with Indigenous youth keeps him firmly committed to improving the well-being of the current and upcoming generations of his people.

"I think being an Indigenous student at HMS is a tremendous blessing that doesn't come without difficulty," he says. "I want other Indigenous youth to know that even in the spaces where we haven't been historically represented, we can be our full authentic selves, learn Western medicine, and also practice our culture unapologetically."

—Ann Marie Menting





### LaShyra Nolen

IN SOME WAYS, NOTHING HAS CHANGED for first-year HMS student LaShyra “Lash” Nolen since physical distancing was instituted in early March.

“Service has always been a big part of my life,” she says, “so I feel I’m pretty much doing what I’ve always done. It’s just that now it’s all virtual.”

As class president Nolen has been working with Dean for Students Fidencio Saldaña, other deans, members of the student council, and volunteers from across the first-year cohort to mobilize a COVID-19 student committee to help her classmates with their unexpected relocations, make sure online education concerns are being heard, and see to students’ general well-being with isolation-busting workouts and social gatherings online.

“Of course students would be anxious,” she says. “We need to make sure everyone feels supported and that we maintain community during this challenging time.”

Holding the top spot in student government is nothing new for Nolen: She was class president in fifth and sixth grade and every year of high school. She welcomes the responsibilities that come with the job, but admits she still has found it difficult to fulfill all her various roles—student, leader, social advocate—while arranging to move back to her native California, organize the student committee, and remain available to peers who need help.

“I’m processing the same emotions of worry and frustration and sadness as other students,” she says, “but as a leader I have to be strong.”


Nolen, who decided to become a “brain surgeon-astronaut” when her goldfish project took first place in a third-grade science fair, has been contemplating issues of social justice at least since age 10, when her family moved from Compton to Cucamonga and she suddenly became “not just smart, but the smart Black person.” Health disparities really hit home for her five years later when her beloved stepfather died of a heart attack. “I started to ask why people end up where they are.”

She dropped the astronaut portion of her dream and tweaked the medical part a little too. Today her plan is to use the joint MD-MPP degree she’s working toward to see patients and teach race theory or serve as an elected official. For now, though, she’s coping as she always has, by writing.

“I pour out my heart on paper,” she says, “so writing down my ideas about social justice really brings me great peace.”

—Elizabeth Gehrman





# in 5

A conversation with Lisa Goodrich, a professor of neurobiology in the Department of Neurobiology in the Blavatnik Institute at HMS

**You study the molecular origins of sensory circuits. Why?**

Early in my career I had the opportunity to be involved in curiosity-driven research that showed relevance to human disease. I was excited to think that I could understand something fundamental about the way the nervous system is put together and have that understanding help people. I still like to straddle those worlds.

I also really like to work on sensory systems that animals use, so that we can actually link what's happening at the circuit level to the way an animal is using that information.

**What is the most rewarding aspect of your work?**

I thoroughly enjoy the prospect of discovery. I've always been excited to find out if what was set up yesterday is going to work out tomorrow. I don't even mind when things don't work because then we've learned we can do something in a different way. But what I find the most rewarding is the chance to share in the successes of all the wonderful people in my lab. That's what motivates me even more than the discoveries we make.

**What was your most recent eureka moment?**

I've had eureka moments, but if I lived for those, it wouldn't sustain me as a scientist. That's not the way science works, and we shouldn't put so much emphasis on those moments. We need to respect the slow, steady progress that comes with putting the pieces together. We should define our successes by whether we believe the

outcome of the experiment, not whether the hypothesis was correct.

**If you could change one thing about the current scientific enterprise, what would it be?**

I feel that sometimes the structure in which we're trying to do science is not best suited for it. We get caught up in the grind of getting papers out and getting promotions and all those things. It frustrates me when that structure gets in the way of discovery or of sharing the truth. There is science with a small s and science with a big S. All of us went into this for science with a capital S. We want to understand the way the world works, and we shouldn't lose sight of that.

**What is your advice to young scientists starting out today?**

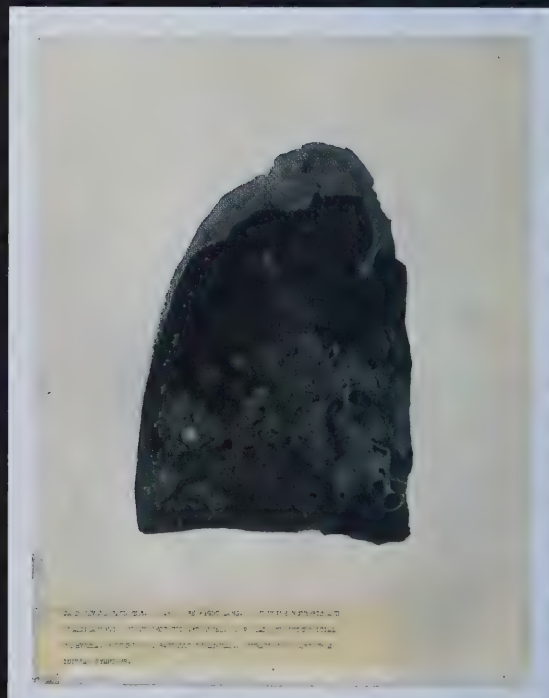
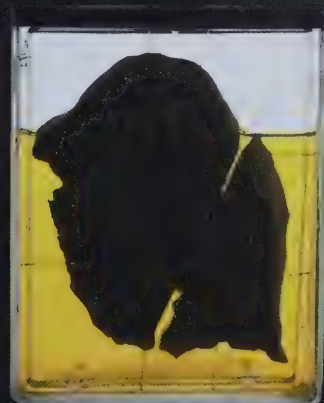
Be flexible in terms of how you're doing an experiment and how you're thinking about the results, but also in terms of your own path. As people go through their training, they're still young and learning, they're experiencing the world differently. I don't think they should feel like they've made a mistake or failed if, at the end of graduate school, they don't want to do the same thing they came in wanting to do. I tell them to look for things that take full advantage of their natural strengths instead of spending all their time trying to get better at things they're not good at. Yes, you have to improve, but you shouldn't let your natural strengths wither while doing that.

—Ekaterina Pesheva



## An influenza outbreak at Camp Devens led to a research push to identify the causative agent

**I**N LATE 1918, on orders from the American Surgeon General, pathologist and former dean of Johns Hopkins Medical School William Welch led a team to investigate the burgeoning influenza outbreak at the Camp Devens military base in Massachusetts. In the camp's autopsy room, Welch quickly recognized the gravity of this "new kind of infection or plague" and recruited S. Burt Wolbach, MD 1903, to continue the investigation. Wolbach, who was the Shattuck Professor of Pathological Anatomy at HMS and chief of pathology at Peter Bent Brigham Hospital, entered a base of 45,000 people and a 1,200-patient hospital that was handling more than 6,000 patients. Dead soldiers were "stacked about the morgue like cord wood" and bodies "were placed on the floor without any order or system." Of the spreading disease and its resulting pneumonia, one base physician wrote, "We eat it, live it, sleep it, and dream it, to say nothing of breathing it 16 hours a day."







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Among the photographs and fixed-tissue samples that S. Burt Wolbach (left) provided to the Warren Anatomical Museum are lung specimens preserved in Kaiserling's fluid (far left, bottom) and images of lung sections showing necrosis, emphysema, and other damage caused by infection with the influenza pathogen.

Wolbach's autopsies revealed bodies that were overwhelmed. Patients' lungs presented a "kaleidoscopic" pathology, an appearance other physicians had likened to the tissue destruction from poison gas.

Wolbach published his preliminary findings in the April 1919 *Johns Hopkins Hospital Bulletin*. Of his twenty-eight recorded postmortems, he observed different disease presentations: one in which the sufferer

was killed quickly, leaving lungs partially collapsed, lax, meaty in consistency, dark red in color, and "dripping wet" with fluid; and another where the patient battled the illness for ten days or more before succumbing, and whose lungs showed extensive bronchitis with bronchopneumonia and peribronchitis.

In 1923, with Channing Frothingham, MD 1906, Wolbach published a more complete analysis of the Devens autopsies

in the *Archives of Internal Medicine*. His objective was to use the "excellent material" that he had collected, including lung tissue fixed in Kaiserling's fluid, to revisit Welch's original 1918 charge to further explore the flu's unsettled cause. At the time, the scientific debate was focused on whether or not the bacterium *Bacillus influenzae* was the primary culprit for the outbreak.

In the end, Wolbach could not determine the 1918-1919 flu's causative agent, but he did rule out *Bacillus influenzae*, believing it to be one of the prevalent secondary organisms, like "the pneumococcus and streptococcus," that proliferated after infection by the primary flu pathogen. This 1923 report proved to be Wolbach's last published analysis on the 1918-1919 flu, but he preserved his photographs of lung sections and the fixed tissue in the Warren Anatomical Museum for future explorations into the disease and to commemorate an event that so marked the physicians and medical scientists of his era.

—Dominic Hall

Dominic Hall is curator of the Warren Anatomical Museum in the Center for the History of Medicine at the Francis A. Countway Library of Medicine.



# A RACE AGAINST BUGS



An excerpt from *Superbugs: The Race to Stop an Epidemic*, by Matthew McCarthy



**I**T WAS JUST AFTER DAWN when I felt the buzz on my hip. I broke stride, put down my coffee, and glanced at my pager: I was needed in the emergency room. It was 2014, an unseasonably warm October day, and the text induced a flurry of anxiety and excitement. After eleven years of training, I had accepted a position as a staff physician at NewYork-Presbyterian Hospital, a tertiary care center on the Upper East Side of Manhattan, and a patient had just arrived with a perplexing infection, one that had stumped the team in the ER.

A moment later, I was standing before a group of medical students and residents and my new patient. The young man writhing on the stretcher was an African American mechanic from Queens named Jackson, with dark-green eyes and a small Maltese cross tattooed onto his neck. He had been shot, and a large area surrounding the bullet, which was still lodged in his left leg, looked infected. As I peered into jagged edges of the entry wound just above Jackson's knee, a student handed me a piece of paper. The printout revealed the results of a microbiological test, which caused my eyes to bulge. My patient, I discovered, was infected with a nimble and aggressive new bacterium that was resistant to every antibiotic at my disposal, except for one: colistin.

I had used the drug only a few times in my career and never with good results because it was so outrageously toxic. Colistin might kill bacteria, but it destroyed kidneys and other internal organs in the process, leaving many of my patients with just two options: dialysis

or death. Antibiotics that had proven so effective just a short time ago were now useless, and if I wanted to save this young man's leg, it was my only option. I shook my head and handed the paper back to my student. "Not good." More than twenty thousand people die every year in the United States from antibiotic-resistant infections, and the pipeline of drugs to treat them is always on the verge of drying up. I crouched to meet Jackson's eyes and carefully considered my words. "You have an infection," I said. "A severe infection."

The man's gaze darted from me to the men and women standing in a horseshoe behind me. "How severe?" He took in a small breath of air and held it, waiting for me to say something. It felt like an hourglass had been flipped; suddenly the tiny room was very hot. I took off my white coat and rolled up my sleeves. "Quite severe."

His eyebrows raised, and I reflexively extended my arm to hold his hand, but caught myself. I wasn't supposed to touch this patient without protection. I pivoted back to my team. "Everybody out. Now." I pointed toward the door. "I'll be right back." Just outside of his room, I put on a disposable yellow gown and a pair of purple nitrile gloves, and returned to the bedside alone. "It's very hard to treat," I said, "but not impossible."

Jackson was now breathing very quickly, on the verge of hyperventilating, as sweat beaded on his forehead. He grasped his thigh, inches above where the bullet had entered. Beneath his fingertips, bacteria were rapidly multiplying, devouring muscle and bone.

"Am I gonna lose it?" he asked. "The leg?"

In truth, I wasn't sure. Only colistin had a chance of destroying the infection, but there were no guarantees. The last person I prescribed it to died twelve hours after she received it. The one before that died while receiving it. "I don't think so," I said, as confidently as I could. I squeezed his sweaty hand and tried to imagine how I would summarize the nuances of the case for his wife and children. They would need to take special precautions just to be in the same room with him. "We're going to get through this," I said as his eyes began to water. "We will."

I left the room, removed my gown and gloves, and addressed my team. "Start colistin," I said. One of the residents frowned as she scurried to a computer to put in the order. Then we vigorously washed our hands and moved on to the next patient.

When rounds were over, I walked across the hospital to the office of my research collaborator, Tom Walsh, director of the Transplantation-Oncology Infectious Diseases Program. Walsh is a wisp of a man, pale and thin like a potato chip, with deep-set eyes, a warm smile, and a surprisingly firm handshake. His modest features are a notable contrast with my own: I have a high forehead, broad shoulders, and a nose that's slightly too large for my face.

We make for an odd pair.

Walsh is one of the world's leading authorities on obscure infections, and when he's not caring for patients, he's creating new antibiotics to treat them. We had met a few years after I graduated from medical school—I still have the elegant biochemical structures he drew for me during our first interaction—and I've been working with him ever since.



In 2009, he moved from the National Institutes of Health (NIH), the federal agency responsible for biomedical research and disease prevention. Walsh brought with him an expansive research consortium—an international team of physicians and scientists who conduct experiments in test tubes, animals, and humans—to develop antibiotics. He is one of the only researchers in the world to oversee a laboratory of this scope; he is an expert in infectious diseases, oncology, pediatrics, internal medicine, pathology, microbiology, and mycology. No one else possesses his breadth of knowledge....

He had called me that October morning in a fit of excitement, with news that Allergan, the pharmaceutical giant, wanted us to run a clinical trial: a large-scale human experiment with an unproven drug. The Dublin-based company was developing a promising new molecule and it wanted us to show it was not only safe but effective in treating humans infected with antibiotic-resistant bacteria, known colloquially as superbugs. They had become a persistent problem for us; superbugs didn't really exist before the 1960s, and they were only sporadically seen in the world until the 1990s. But a combination of poor prescribing practices by doctors along with the indiscriminate use of antibiotics in commercial agriculture and farming exposed bacteria to our precious arsenal of effective drugs, and the microbes figured out ways to neutralize them. Superbugs were now everywhere—even on stray bullets in Queens—and they had become a leading cause of deadly infections in humans. "So what is it?" I asked Walsh as I entered his office. He leapt up from his messy desk, hurrying past framed diplomas and awards that covered every inch of the mahogany walls, to greet me. "What's the drug?"

Walsh looked exhausted—the man regularly slept only three hours a night—because we were in crisis mode, desperately searching for new antibiotics to treat our patients. I had grown accustomed to watching men and women succumb to infections that had been treatable just a few years ago. When Walsh shook my hand, he brightened. "Dalbavancin," he said softly.

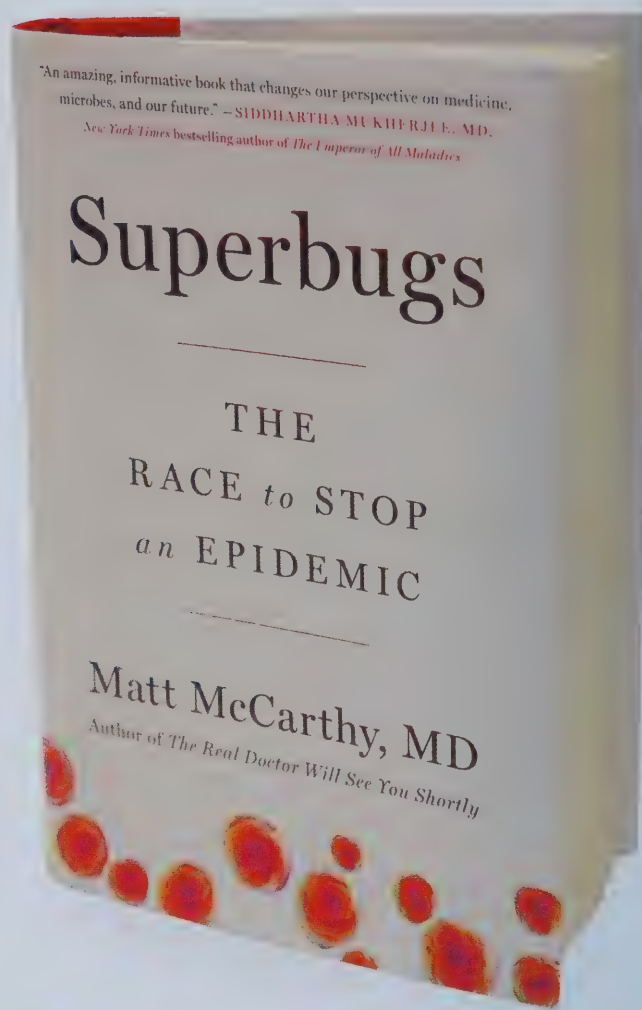
My fingers and wrists were still damp from the tense exchange in the emergency room; I wiped them on my khaki pants and sat down in the chair next to his desk. "You're kidding."

He handed me a thick manila folder. "I'm not."

Just the word—*dalbavancin*—brought me back fourteen years, to my days as an undergraduate tinkering around in the laboratory of a future Nobel laureate named Tom Steitz [PhD '67], a biophysicist who was known around campus as "the Michael Jordan of crystallography," the branch of science that probes the atomic building blocks of life. Steitz studied protein synthesis, an essential function of nearly all living things, and his discoveries led to all sorts of new drugs, including a handful of antibiotics related to dalbavancin, called "dalba" for short. Like Tom Walsh, he was a visionary who could see drug development in ways that others couldn't.

I connected with Dr. Steitz through his son, Jon, who had happened to be my teammate on the Yale University baseball team. He and I were pitchers and biochemistry majors, and we were both drafted out of college to play professional baseball; Jon

**Superbugs  
were now  
everywhere  
—even on  
stray bullets  
in Queens.**



was selected by the Milwaukee Brewers in the third round of the 2001 Major League Baseball draft, and I was taken the following year, in the twenty-first round, by the Anaheim Angels. We briefly thought we were destined for the big leagues.

A year later, after a stint playing minor league baseball in Provo, Utah, I was cut by the Angels and exchanged my baseball mitt for a stethoscope. I enrolled at Harvard Medical School in the fall of 2003, moving to Boston around the time Jon gave up the game and went to Yale Law School. A few weeks after classes began, I attended a lecture by a young and charismatic infectious disease doctor named Paul Farmer [MD '88 PhD '90], cofounder of the global nonprofit Partners In Health, and immediately knew what I wanted to do with the rest of my life. I was going to study infections to learn how to defeat them.

"Let's get to work," Walsh said, snapping me out of my reverie.

This was the moment everything changed, when I went from a passive observer of drug resistance to an active participant in the race to stop the expanding threat of superbugs. But before I could start the long and winding journey of a clinical trial, I had to familiarize myself with the painful lessons learned from generations of failed studies and appalling ethical lapses, as well as the remarkable scientific advances behind the work of Tom Steitz, Tom Walsh, and others... It's an adventure dotted with clues that would help me unravel the mystery of Jackson's infection....



## Oversight

A maxim in medicine is that antibiotic resistance comes with a fitness cost, meaning that when bacteria become impervious to antibiotics—when they mutate into superbugs—they sacrifice something vital in return. Devoting resources to evasion leaves superbugs exhausted and unable to spread. It's a phenomenon that infectious disease specialists count on, but it turns out this paradigm is changing: superbugs have recently become more fit and more virulent. In other words, they're getting smarter and stronger.

This had profound implications for my dalba trial and the risk associated with participation. It was clear from the IRB's terse wording that I had underestimated the possible dangers dalba posed to patients. I was offering a false sense of security by telling them that I could potentially cure their infection and shorten their hospital stay. But it was far from certain that this would, in fact, be the case. I hadn't mentioned efflux pumps—the microscopic vacuum cleaners that bacteria use to suck up and expel antibiotics—or any of the other chemical modifications that they might use to neutralize dalba. I hadn't mentioned that bacteria were becoming more aggressive and that my drug might not work. The protocol was in need of a drastic rewrite.

To gain a bit of perspective, I reached out to several experts to understand how they approach clinical trials and antibiotic research. I started with Brad Spellberg, chief medical officer of LAC+USC Medical Center, a top-flight, oddly punctuated health care and research center. Spellberg is a thoughtful and devoted physician-scientist; he's also a provocateur. At a major conference in San Diego, I listened with delight as he stood at a podium, calling out pharmaceutical companies by name for the trials they should have done but were scared to attempt....

Spellberg and his colleagues believe that resistance already exists to all antibiotics, including those we have not yet discovered. To understand how this is possible, we might invoke the infinite monkey theorem, which argues that a monkey hitting keys at random on a computer keyboard for an infinite amount of time will eventually produce coherent text, including the complete works of William Shakespeare. By way of comparison, microbes are constantly mutating, hitting the proverbial keys in novel combinations, and those sequences produce enzymes and pumps that can deflect or destroy any antibiotic. Spellberg and his team have noted that antibiotic resistance has even been discovered “among bacteria found in underground caves that had been geologically isolated from the surface of the planet for 4 million years.” It's a terrifying thought that called into question the very essence of my trial....

“There are already widespread resistance mechanisms in nature to drugs we haven't invented yet,” he told me one morning before rounds. “When we come out with a new antibiotic, people think new mutations occur after we start using the drug, but that is false. The much bigger problem is that there are low levels of preexisting resistance mechanisms that we can't yet detect. When we dump a new antibiotic into the environment, we apply selective pressure and resistance grows.” Eventually we will run out of new drug

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targets. “We need to be smart about this,” he added. “Bacteria use antibiotics judiciously. Humans do not.”

Spellberg told me that the solution is to take the long view. “We don't want a flood of new antibiotics,” he said. “We need a slow and steady drip.” Bringing a number of antibiotics to market simultaneously would be problematic, he explained, because resistance would occur in tandem. We desperately need more antibiotics, but it would be a mistake to test all of the best candidates simultaneously....

I revised the dalba protocol, conceding that the risk had been understated, and resubmitted it. “Fingers crossed,” I said to Tom. The leitmotif of his expansive career had been to solve the unsolvable; I had faith that together we could steer our study through the lattice-work of approvals and regulations. “I feel pretty good about this.”

“Now we wait,” he replied.

I went back to seeing patients, and Tom returned to writing grant proposals. What struck me in the weeks that followed, as we waited for a response from the IRB, was the rising number of patients who were admitted to my hospital because oral antibiotics were no longer working. They had routine infections—pneumonia or urinary tract infections—that in prior years could have been treated at home with a week's worth of pills. But the treatments simply weren't strong enough. Bacteria really were getting smarter and stronger. In the week after I revised the protocol, Jackson passed in and out of my emergency room twice. He told me the infection prevented him from seeing his daughter's dance recital and his son's first basketball game. “Nothing seems to work,” he said. And he was right. He was coping with a chronic infection and hoped that he wasn't spreading it to others.

This shift in the way we treat infections—from oral to intravenous antibiotics—was contributing to a burgeoning crisis at the hospital. Due to overcrowding, patients were waiting up to thirty hours in the ER just for a bed to open up. On some days, we had to turn ambulances away. There simply wasn't the space for the additional bodies, and patients were instructed to look elsewhere. Jackson was just one of hundreds of patients I've cared for with a superbug infection. Many of these people died, and even more were left profoundly debilitated....

There was no good way to predict who would contract an infection or who would succumb to the illness. We were all at risk because bacteria don't discriminate—they attack all comers: the young, the old, and everyone in between. They were outfoxing us, and in some ways it felt like we were returning to a pre-antibiotic era, one in which a century of scientific progress had simply been erased. While waiting for a response from the IRB, I kept asking myself: *Why is it so hard to make a new antibiotic?* ■■

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*Matthew McCarthy, MD '08, is an assistant professor of medicine and a hospitalist at Weill Cornell Medicine in New York City. This article contains excerpts from his international bestseller, *Superbugs: The Race to Stop an Epidemic*, published by Penguin Random House's Avery imprint in 2019. Excerpts appear with permission from the author and his publisher. Bracketed material added with permission.*









The Longwood Symphony Orchestra, established in 1982 by a group of physician-musicians in the Longwood Medical Area, continues to showcase the talents of HMS faculty and students.

—JEAN-FRANÇOIS CAUBET

DETAILS, UPDATES, AND OBSERVATIONS FROM ALUMNI

## Did you play an instrument or sing **while you were in medical school?**

### **Katherine Murray Leisure, MD '78**

Yes, music has an important role in our lives! At HMS, we had great fun singing madrigals and folk songs in Vanderbilt Hall as the Grand Rounds Singers under **William Kupsky, MD '78**. And I was mesmerized hearing violinist **Yeou-Cheng Ma, MD '77**, and others perform in the majestic Vanderbilt Hall dining room. During my public health years, I sang gospel with physician-missionaries Paul and Margaret Brand, hospital staff, and patients with leprosy within a lively Baptist church in Carville, Louisiana, sometimes accompanied by Hawaiian steel guitar.

I studied voice and sang with choral and opera groups in central Pennsylvania, including a community performance of the

Mozart *Requiem* in the Harrisburg, Pennsylvania, capitol building rotunda shortly after the World Trade Center was destroyed on September 11, 2001. I sang my fourth full performance of the Mozart *Requiem* with the Pilgrim Festival Chorus in Scituate, Massachusetts, in 2019. This was a poignant *Lacrimosa*, as my 33-year-old daughter was battling adult Ewing sarcoma and died later that year. To quote Pablo Casals, “Is not music the divine way to tell beautiful, poetic things to the heart?” For me, it started in Vanderbilt Hall decades ago.

### **George Ryan, MD '53**

Music has long been an important part of my life. I am a jazz trumpet player and have played since age 10. I played while in medi-



cal school and residency and during my service in the U.S. Army. I played while in private practice with bands in the Boston area. And I played while I was a professor of obstetrics and gynecology at the University of Tennessee. I founded the Memphis Traditional Jazz Festival in 1982 and also began the Hot Cotton Jazz Band that year. That band became a favorite nationally and internationally. In 2018, I was inducted into the Arkansas Jazz Hall of Fame.

Though I am now 90, I will continue playing until it is physically impossible.

#### Howard Rubenstein, MD '57

As a medical student at HMS, I attended as many rehearsals of the Boston Symphony Orchestra as I could. The rehearsals were educational, fun, and inexpensive, and for me more enjoyable than the actual concert because I could see the conductor interacting with the instrumentalists, and the latter interacting with each other. And I loved **Richard Sogg's** (MD '56) concerts or when he played the piano in Vanderbilt Hall. I could barely play the piano or any other instrument, and my only exhibition of musicianship at HMS was when I was cast in the chorus of the Second Year Show. We sang "Everyone Runs to Harry," a reference to Harry Trimble, a professor sympathetic to and an advocate for struggling students like me. The ditty, one of many showstoppers, went to the tune of "3 Little Maids" from *The Mikado*.

I have retained an interest, and an involvement, in theater. In 2011, the *Romance of the Western Chamber*—a musical with my English lyrics on the stage with Mandarin supertitles—had its world premiere in Hangzhou, China. It was the first time this remarkably modern Chinese thirteenth-century play was produced in English. It premiered off-off Broadway in 2017 to good reviews and will have its West Coast premiere in San Diego in July. My most recent work is a modern adaptation of an ancient Greek tragedy. It is slated to run off-Broadway in September 2020.



Tapping the often surprising talents of second-year medical and dental students, the Second Year Show was a campy tradition that students enjoyed and faculty good-naturedly endured. The shows are no longer produced, but the posters of bygone ones capture some of their wit—and irreverence.

#### Karl Singer, MD '67

During medical school, every Sunday morning, I would take my viola to Cambridge and join three colleagues for string quartets. For those two hours, no thought of med school would enter my head. I also rejoined the Harvard orchestra, where I was fortunate enough to meet my wife.

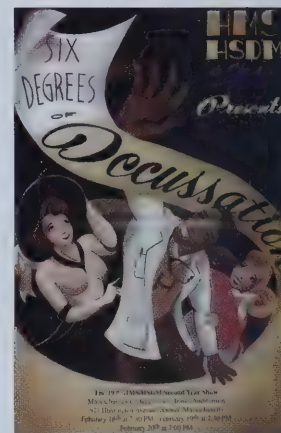
Music continues as a passion. I play chamber music once a month, play in the student orchestra at Exeter Academy, and take viola lessons. Playing music is a wonderful way to challenge all parts of my brain.

#### William Hood, MD '58

Music was important to me while I was a medical student, and it continues to have an important role in my life.

#### Michael Rasminsky, MD '64

I came to HMS with a musical theater background (the road not taken) and wrote the music for our Second Year Show, "For Prevention of Disease Only." The definitive review was delivered the following morning by the Vanderbilt caretaker who opined, "I have seen many of these shows in my time. Yours was by no means the best, but it was certainly the dirtiest." High praise indeed for medical juvenilia. A pianist and avid amateur chamber musician, I now engage in less scatological musical pursuits.



#### Samuel Katz, MD '52

I played drums with a professional group most weekends.

#### Claire Broome, MD '75

During medical school, my only singing was in the Second Year Show, but in my forties, I realized vocal harmony was a passion. Thirty years later, I'm singing Palestrina, Byrd, and Monteverdi motets, and I'm now learning duet singing. Professional accomplishments are irrelevant—singing one's part on pitch is what's valued.

#### Luis Fernandez-Herlihy, MD '49

Harmonica. I hum in private, occasionally.

#### Brandon Lujan, MD '02

I began to learn guitar as I was finishing residency. Music has been a major outlet from stress and a source of inspiration ever since. I'm glad I was willing to take on something new. I've derived tremendous joy from it, despite being a perpetual beginner.

#### William Kupsky, MD '78

I played the piano in Vanderbilt Hall, was involved in the music preparation and performance for the Second Year and Fourth Year class shows, "Call It the Flu" and "Stoma," respectively, sang in and later directed the Grand Rounds Singers, served



as student liaison helping to organize the Vanderbilt Hall student-faculty concerts, and during senior year participated in an a cappella quartet with three nonmedical singers. We performed with several class members on Class Day.

#### **Ernest Bergel, MD '56**

I did continue to play the piano to some extent but did not have the time or energy for piano lessons or regular practicing. Classical music has been a source of inspiration, comfort, and consolation for me during my entire adult life.

#### **Robert Brooks, MD '55**

I had some piano lessons, but do not play. Classical music is my favorite. I loved the Boston Symphony and other classical music while I was in Boston. I continued to enjoy it here in Phoenix as long as I could get out. Now I continue to enjoy classical music on KBAQ, our local PBS station.

#### **Richard B. Dobrow, MD '62**

I have played the piano essentially all my life and did so in medical school. Throughout my life as a physician, I continued to give recitals in public. Since my retirement, I'm practicing the piano more than ever. I recently moved into a senior community, and just two days ago gave a public recital to an audience of 160 people. There are far more physicians here than musicians.

#### **Richard Hirschhorn, MD '58**

I have played the piano since I was nine years old and still play every day. I even played in a cocktail lounge on an ocean cruise a few years ago.

#### **Donald Dillon, MD '59**

I did not sing or play an instrument. I like music but not modern-day lyrics, singers, or groups. If I listen, it is 1970s or pop (as in Boston Pops).

#### **Sina Saidi, MD '94**

I played guitar at HMS and started a band with four classmates. Playing "Good Lovin'" and "Black Water" at Vanderbilt Hall was one of the most fun med school experi-



ences. I continued to play folk and classical guitar for years, but recently picked up piano. Learning to play pieces by Beethoven or Mozart, albeit at a basic skill level, has been a very enriching part of life.

#### **Nathan Selden, MD '93**

I played guitar for fun and had a small occasional band in college. But these pastimes have slipped away in favor of others. I still have my guitar. Maybe I will pick it up again.

#### **Bruce Barnett, MD '75**

I played my saxophone when I could in medical school. Music is still a great joy to me and is a very important part of family life.

#### **Joseph McCabe, MD '74**

Music is incredibly important to me. I played piano while in school and have been taking piano lessons for the past 16 years. I play regularly. I took voice lessons in the

past and have performed with groups and individually as an amateur.

#### **Bartholomew Tortella, MD '80**

I played the organ at church, and still do. Many happy memories of playing at Mass at the Paulist Center on Park Street in Boston. Music is a wonderful release for me to create sound and praise and share community with friends.

#### **Dale Cowan, MD '63**

I played trombone in the Harvard University Band and continued during medical school. I still play and will join the HUB for its 100th anniversary this October.

#### **Tamara Fountain, MD '88**

I played violin up through early college. I dusted it off to play in some student talent shows at Vandy during med school but that was pretty much it. Music is so important. It brings back memories, lessens pain and anxiety, and boosts mood.

#### **Stephen Schoenbaum, MD '66**

I played the piano during medical school, and still do. Music has a very important role in my life. I have learned a lot of chamber music and enjoy playing with others. My wife and I go to many concerts throughout the year.

#### **Bob McKinstry, MD '92**

I sang a bit in the Second Year Show. I toyed with guitar, but I had given up piano. Big mistake. I picked up piano again in 2012 and it has been my number one stress reliever.

#### **Dick Aadalen, MD '65**

I sang in a chorus during med school and have continued to sing in my church choir and in a community mixed chorus.

#### **Royce Moser Jr., MD '61**

I sang in church choir and recently sang "Holy City" in our church. I sang "La Vie en Rose," "Unchained Melody," and "Some Enchanted Evening" to Lois on our fiftieth and sixtieth (!!) wedding anniversaries.





**Patricia Williams, MD '78**

I sang in several groups during medical school, including a women's Balkan singing group, which, alas, proved to have too demanding a schedule, and the Harvard Graduate Chorale. Several of us in the class of 1978 (including me, Christopher "Kit" French, Susan Okie, and Walter Weiss) had a grand time as the Grand Rounds Singers under the direction of our classmate, Bill Kupsky. Since HMS I have sung in community theater, various choruses, and, most recently, a folk/pop/jazz trio.

**Linda Waldman, MD '81**

I sang in the Chorus pro Musica in Boston until nights on call during rotations interfered. I sang in the Medical School Madrigal Group all four years. I was the music director for our Second Year and Fourth Year class shows as well as for the House Staff Show at Boston Children's Hospital. As soon as I finished my training, I joined the New Haven Chorale, and 33 years later I'm still with them! Music has always been a crucial part of my life.

**David Dorsky, MD '82**

I studied and played piano starting in third grade, mainly classical, though not particularly well, and continued in med school and beyond. I have also played guitar since high school, mostly folk and traditional fiddle tunes and joined a contradance band, which is how I met my wife. She plays fiddle. Music is a vital part of my life today, and I play piano nearly every day and accompany my violinist son when he's around.

**Richard Peinert, MD '73**

I think just about everybody played a musical instrument. It was the piano for me, and I spent many hours working up Beatles tunes on the Steinway in Vanderbilt Hall. A classmate who shall remain nameless wanted a Hammond organ for his room. After a long sob story to the financial aid people, he got the \$3,000 at a one percent interest rate for his organ! Anyone from our class reading this will know who it was. He was a darn good organist, which came in handy for Second Year and Fourth Year class shows.

**John Mordes, MD '73**

No, but music is an important part of my life.

**Paul Wheeler, MD '61**

No music in med school, but I loved Dixieland music before HMS and have added bluegrass, classic Broadway, movie musicals, and classical music. I hate most music now polluting radios.

**John Merrifield, MD '59**

Not while I was in school but now I listen to music with huge pleasure.

**Carolyn Aldredge, MD '63**

I only played and sang for my own enjoyment, but music always will be an important source of enjoyment and stress relief for me.

**Peter Barrett, MD '60**

The Second Year Show was a landmark event for the Class of 1960. Lenny Shulman's expertise on piano held the musical part of the show

together, including a memorable tune that featured a squeaky clarinet and an enthusiastic tuba. Sadly, the Second Year Show is no longer a part of the HMS scene.

**Joe Barr, MD '60**

I'm tone deaf, but I've always enjoyed classical music.

**Mary Flowers, MD '78**

I used to sing all the time and was pretty good. I don't sing much anymore. No music in my head or heart. Bring back the music!

**Samuel Kim, MD '62**

Yes I did, and music still has an important role in my life.

**Robert Ockner, MD '61**

I began studying the cello as a freshman at Pomona College, and I have continued to the present.

**John Stanley, MD '58**

Yes. I played the violin in medical school, and still do at age 85. I still play OK. Now I also make and repair violins.

*Thanks to all who shared recollections of the role of music in their lives, past and present.*

*The next issue of Harvard Medicine will carry your responses to the questions: What intramural or club sports groups were active while you were in medical school? Did you participate in a sport?*

*Responses can be submitted online: [hms.harvard.edu/rounds](https://hms.harvard.edu/rounds); via email: [hmsalum@hms.harvard.edu](mailto:hmsalum@hms.harvard.edu); by phone: 617-384-8520; or by mail: Rounds, Alumni Affairs and Development, Harvard Medical School, 401 Park Drive, Suite 505, Boston, MA 02215.*



# Obituaries

## 1930s

### 1939

William L. Proudfit, MD  
February 11, 2020

## 1940s

### 1943

Grant V. Rodkey, MD  
January 22, 2020

### 1945

Evan Calkins, MD  
January 24, 2020

### 1947

John D. Stoeckle, MD  
April 23, 2020

### 1948

Mortimer L. Mendelson, MD  
January 8, 2020

### 1949

John L. Juergens, MD  
December 13, 2019

Lester W. Martin, MD  
March 13, 2020

## 1950s

### 1950

Paul Mandelstam, MD  
March 23, 2020

### 1952

Patricia B. Wilber, MD  
February 9, 2020

### 1954

Franklin M. Draper Jr., MD  
November 18, 2018

Ernest R. Simon, MD  
January 13, 2020

### 1955

Charles A. Cahill, III  
March 1, 2020

Frederick M. Ehrlich, MD  
January 28, 2020

Sidlee W. Leeper, MD  
February 14, 2020

### 1956

Bruce L. Gilmore, MD  
November 19, 2019

Jack J. Greenberg, MD  
November 26, 2019

### 1957

John W. Singleton, MD  
February 3, 2020

David Van Buskirk, MD  
November 4, 2019

### 1958

Edwin Harold Eylar, PhD  
July 29, 2019

Gene E. Lynn, MD  
December 21, 2019

### 1959

Peter V. Teal, MD  
February 8, 2020

## 1960s

### 1960

Philip Leder, MD  
February 2, 2020

### 1961

William G. Appleton Jr., MD  
December 30, 2019

Frank B. Hoefle, MD  
April 19, 2020

### 1962

Richard L. Veech, MD  
February 2, 2020

### 1966

Robert M. Crowell, MD  
March 24, 2020

Herbert C. Jurgeleit, MD  
March 15, 2020

### 1967

Philip L. Goldsmith, MD  
December 13, 2019

### 1969

John R. Freeman, MD  
November 7, 2019

F. Woodhall Stopford, MD  
March 23, 2020

## 1970s

### 1975

Barbara A. Abercrombie, MD  
April 1, 2020

Jonathan P. Weisul, MD  
July 21, 2019

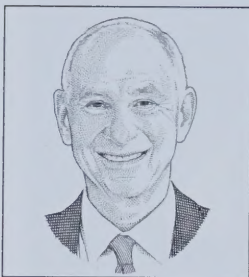
This listing of deceased alumni includes those whose notices of death were received between December 1, 2019, and April 30, 2020.





## PRESIDENT'S REPORT

# A Goal of Debt-free Medical Education



I AM PLEASED TO REPORT that the Alumni Council reached an important milestone in its initiative devoted to student financial aid: Council members unanimously approved the goal of pursuing debt-free medical education for students with financial need. For now, the goal is aspirational. But the historic unanimous vote gives the Council a green light to work with alumni colleagues and HMS leadership in developing a plan to achieve this worthy goal.

The decision was informed by a philosophical platform crafted by Dean for Medical Education Edward Hundert,

MD '84. An excerpt sums up the argument:

*We strive to encourage idealistic students from all socio-economic backgrounds to become compassionate physicians committed to the highest standards of care, the greatest heights of innovation, and the enormous responsibilities of leadership. Therefore, we are focused on ensuring that admitted students can come to HMS and do not graduate with devastating debt that might push them to select a career path based on their financial needs rather than their true passions. To reduce student debt—with the hope of eliminating it—we are committed to upholding our longstanding twin principles of need-blind admissions and need-based aid, and we aspire to debt-free medical education at HMS.*

The vote came after careful deliberation that also included consideration of other financial aid mechanisms and reports of conversations with HMS and University leadership, including those with Dean George Q. Daley, MD '91, and Harvard President Lawrence Bacow. In addition, the Council benefited from presentations by two student members of the HMS Financial Aid Committee, each a recipient of a REACH scholarship (Resilience, Excellence, Achievement, Compassion, and commitment to Helping the underserved). The students advocated for expanding the Dean's REACH Scholarship Award Program by offering it to more students from disadvantaged backgrounds who have a demonstrated commitment to serving underserved populations; using loan repayment (also called loan forgiveness) programs to provide debt relief to graduating students who pursue careers in public service or global health; and using the Middle Income Initiative to support families facing financial burden.

Other updates from the meeting include:

- The selection of David J. Brown, MD '97, as the second recipient of the **Distinguished Service Award for HMS Alumni**. The award recognizes his dedication to mentoring HMS students and to building a culture of diversity and inclusion at our School.

- The formation of a subcommittee, led by Councilor for the Ninth Pentad, Ted Kohler, MD '76, that would explore possible mechanisms for helping alumni who, after interrupting their careers, are now exploring reentry.

- A review of the successful efforts by the Office of Alumni Affairs and Development to engage alumni through regional events and reunions. **Please get involved!** Vote in the annual Alumni Council election, become an MD Alumni Advisor, submit your responses to Rounds in *Harvard Medicine* magazine, and more.

Several alumni have contacted me directly regarding issues of potential interest to the Council and alumni. I thank them for their suggestions and wish to remind everyone that we welcome your thoughts and ideas.

*Michael Rosenblatt, MD '73, is senior partner at Flagship Pioneering in Cambridge, Massachusetts.*

## Alumni Announcements

### Alumni Stories

We salute our alumni working on the frontlines or behind the scenes to combat COVID-19 and provide comfort during the pandemic. We are grateful for their efforts and proud to highlight the power and impact of the HMS alumni community at

[alumni.hms.harvard.edu/stories](http://alumni.hms.harvard.edu/stories).

### Distinguished Service Award for HMS Alumni

Congratulations to this year's recipient, David J. Brown, MD '97. Brown is recognized for his commitment and dedication to fostering a culture of diversity and inclusion in the medical profession by mentoring HMS students, including by creating and managing an annual dinner, with his classmate Alicia Barba, MD '97, that brings together the School's alumni and students from groups underrepresented in medicine and opens paths to success in research, academia, industry, clinical care, and entrepreneurship. Learn more at [alumni.hms.harvard.edu/service-award](http://alumni.hms.harvard.edu/service-award).

### Class Listservs

MD alumni can connect with their HMS classmates through private class listservs. All members of every class are automatically included on these digital forums using the email addresses on file with Harvard University. Listservs can be used to share personal news, initiate conversations about health care, or read exchanges among classmates. To learn more, visit [alumni.hms.harvard.edu/connect](http://alumni.hms.harvard.edu/connect).

### Electronic Journal Access

Alumni can access thousands of peer-reviewed journals and more than 2,000 seminars online. To access the available collections, visit [alumni.hms.harvard.edu/online-journals](http://alumni.hms.harvard.edu/online-journals).

### Volunteer Opportunity

MD alumni working worldwide in patient care, research, industry, business, and academia are invited to sign up to advise students on their careers. Volunteers provide guidance on topics ranging from specialties to residencies and also help with mock internship interviews. If you would like to help expand the program to include more alumni at different stages of their careers and working in a wide variety of fields, contact Dea Angiolillo, MD '79, at [dea\\_angiolillo@hms.harvard.edu](mailto:dea_angiolillo@hms.harvard.edu).





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"Combining insights from adult education with responsive curriculum revisions, HMS innovates to meet the demands of a challenging environment. Financial support for our students today helps make possible their achievements in service and scholarship tomorrow."

— Mitchell T. Rabkin, AB '51, MD '55  
*CEO Emeritus  
Beth Israel Deaconess Medical Center*

# WHAT WILL BE YOUR LEGACY?

Mitchell T. Rabkin has spent nearly 70 years as a member of the Harvard Medicine community, as a student, researcher, teacher, mentor, and hospital CEO. By naming HMS in his estate plan, he is also ensuring he makes a lasting impact.

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PAUL DIMATTIA

## Middle ground

The photo essay in this issue was shot one April morning by freelance photographer Gretchen Ertl. Traffic was light to nonexistent on Longwood Avenue during what would have been the morning rush, allowing her to stand in the middle of the road and photograph uninterrupted.